Hon.mus Francisc.us Bacon.s Baro de Veru-
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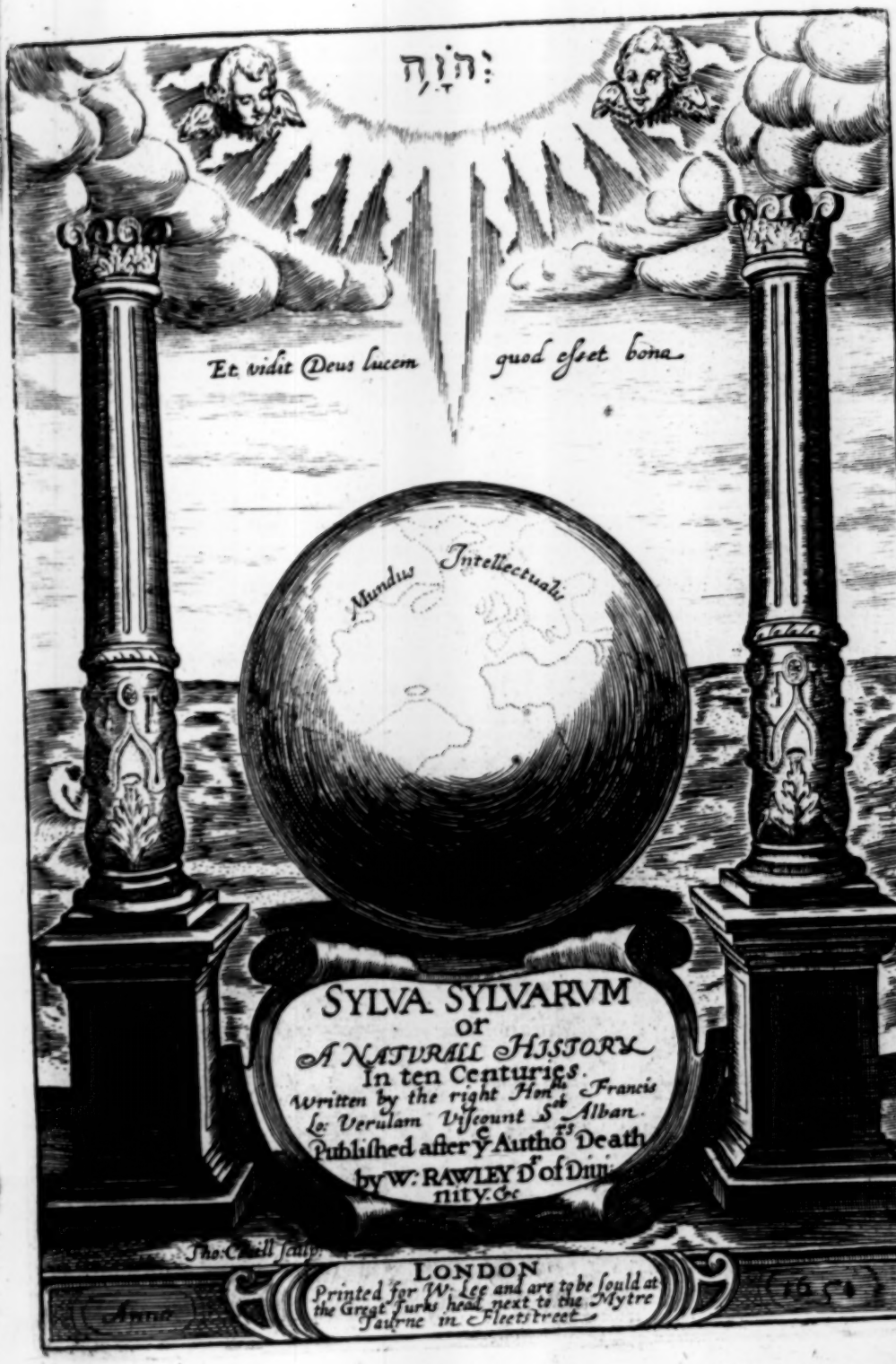
יהוה
Et vidit Deus lucem quod esset bona
Mundus Intellectualis
SYLVA SYLVARVM
or
A NATVRALL HISTORY
In ten Centuries.
Written by the right Hon.ble Francis
Lo: Verulam Viscount St. Alban.
& published after y Autho Death
by W: RAWLEY D.r of Divi
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Tho: Cecill Scalpsit
LONDON
Printed for W. Lee and are to be sould at
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Anno
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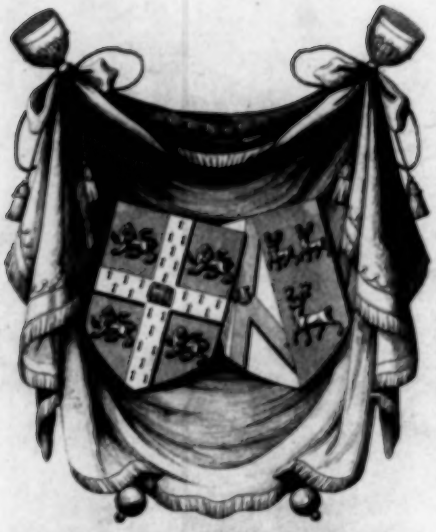

Academiæ Cantabrigiensis
Liber.

XVII. 29. 10

SYLVA SYLVARVM:

OR,

LE.24.31.

A Naturall Hiſtory.

IN TEN *CENTURIES.*

WHEREUNTO IS NEWLY ADDED the Hiſtory *Naturall* and *Experimentall* of LIFE and DEATH, or of the Prolongation of Life.

BOTH WRITTEN BY THE RIGHT *Honourable FRANCIS LO. Verulam* Viſcount St *ALBAN.*

Publiſhed after the Authors death,

By WILLIAM RAVVLEY *Doctor in Divinity, one of his Majeſties Chaplaines.*

Hereunto is now added an Alphabeticall Table of the principall things contained in the ten *Centuries.*

The ſixt Edition.

LONDON,

Printed by *J. F.* for *William Lee*, and are to be ſold at the Great *Turks* Head over againſt *Fetter-Lane* in *Fleetſtreet*, 1651.

SYLVA:

OR,

A Natural History.

IN TEN CENTURIES.

WHEREUNTO IS NOW LAST ADDED
the History Natural and Experimental of
LIFE and DEATH, or of the
Prolongation of Life.

TO THE MOST HIGH AND MIGHTY PRINCE CHARLES,

BY THE GRACE OF GOD,

King of *Great Britaine, France,* and *Ireland*, Defender of the Faith, &c.

May it please your most Excellent Majesty;

THE whole Body of the *Naturall History*, entirely designed or written, by the late *Lord Viscount S. Alban*, was dedicated to your *Majesty*, in his Book *De Ventis*, about foure yeares past, when your *Majesty* was *Prince*. So as there needed no new Dedication of this *Worke*, but onely in all humblenesse, to let your *Majesty* know, it is yours. It is true; if that *Lord* had lived, your *Majesty*, ere long, had beene invoked, to the Protection of another *History*; whereof, not *Natures Kingdome*, as in this, but these of your *Majesties*,

(during the Time and *Raigne* of *King Henry* the *Eighth*) had beene the Subject: Which ſince it died under the Deſignation meerely, there is nothing left, but your *Majeſties* Princely Goodneſſe, graciouſly to accept of the Vndertakers Heart, and Intentions; who was willing to have parted, for a while, with his Darling *Philoſophie*, that he might have attended your Royall Commandement, in that other *Worke*. Thus much I have beene bold, in all lowlineſſe to repreſent unto your *Majeſtie*, as one that was truſted with his *Lordſhips Writings*, even to the laſt. And as this *Worke* affecteth the *Stampe* of your *Majeſties Royall Protection*, to make it more currant to the *World*; So under the *Protection* of this *Worke*, I preſume in all humbleneſſe to approach your *Majeſties* preſence; And to offer it up into your *Sacred Hands*.

Your MAJESTIES moſt Loyall and Devoted Subject,

W. RAWLEY.

TO

To the Reader.

HAving had the Honour to be continually with my *Lord*, in compiling of this *Worke*; And to be employed therein; I have thought it not amisse, (with his Lordships good leave and liking,) for the better satisfaction of those that shall reade it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say, that if he should have served the glory of his own Name, he had been better not to have published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have: But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himselfe. And he knew well, that there was no other way open to unloose Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiving Notions, and Theories; and thereby made Impotent for Generation of Workes; But onely no where to depart from the Sense, and cleare experience; But to keepe close to it, especially in the beginning: Besides, this *Naturall History* was a Debt of his, being designed and set down for a third part of the *Instauration*. I have also heard his Lordship discourse, that Men (no doubt) will think many of the *Experiments* contained in this Collection, to be Vulgar and Triviall: Meane and Sordid; Curious and Fruitlesse: And therefore he wisheth, that they would have perpetually before their Eyes, what is now in doing: And the difference between this *Naturall Historie*, and others. For those *Naturall Histories*; which are Extant, being gathered for Delight

light and Uſe, are full of pleaſant Deſcriptions and Pictures; and affect and ſeeke after Admiration, Rarities, and Secrets. But contrariwiſe, the Scope which his Lordſhip intendeth, is to write ſuch a *Naturall Hiſtorie*, as may be Fundamentall to the Erecting and Building of a true *Philoſophy*: For the Illumination of the *Underſtanding*; the Extracting of *Axiomes*, and the producing of many Noble *Workes*, and *Effects*. For he hopeth by this meanes, to acquit himſelfe of that, for which he taketh *Himſelfe* in a ſort bound; And that is the Advancement of all Learning and Sciences. For having in this preſent Work Collected the Materialls for the Building; And in his *Novum Organum* (of which his Lordſhip is yet to publiſh a Second Part) ſet down the Inſtruments and Directions for the Work; Men ſhall now be wanting to themſelves, if they raiſe not Knowledge to that perfection, whereof the Nature of Mortall Men is capable. And in this behalfe, I have heard his Lordſhip ſpeake complainingly; That his Lordſhip (who thinketh that he deſerveth to be an Architect in this building) ſhould be forced to be a Workman, and a Labourer; And to digge the Clay, and burn the Brick; And more then that, (according to the hard Condition of the *Iſraelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it nothing will be done: Men are ſo ſet to deſpiſe the meanes of their owne good. And as for the *Baſeneſſe* of many of the Experiments; As long as they be Gods Works, they are honourable enough. And for the *Vulgarneſs* of them; true *Axiomes* muſt be drawne from plaine Experience, and not from doubtfull; And his Lordſhips courſe is to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewiſe muſt be broken and grinded, and not whole, or as it groweth. And for *Uſe*, his Lordſhip hath often in his Mouth, the two kindes of *Experiments*, *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments of Uſe*, and *Experiments of Light*: And he reporteth himſelfe, whether he were not a ſtrange Man, that ſhould think that Light hath no Uſe, becauſe it hath no Matter. Further his Lordſhip thought good alſo, to adde unto many of the *Experiments* themſelves, ſome *Gloſſe* of the *Cauſes*, that in the ſucceeding work of *Interpreting Nature*, and *Framing Axiomes*, all things may be in more readineſſe. And for the *Cauſes* herein by him aſſigned; his Lordſhip perſwadeth Himſelfe, they are farre more certaine, than

thoſe

those that are rendred by Others; Not for any Excellency of his own Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with *Nature*; and *Experience*. He did consider likewise, that by this addition of *Causes*, mens mindes (which make so much haste to finde out the *Causes* of things:) would not think themselves utterly lost, in a vast wood of *Experience*, but stay upon these *Causes*, (such as they are, a little, till true *Axiomes* may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact *Method*, (though he that looketh attentively into them, shall finde that they have a secret Order) was because he conceived that other men would now think that they could do the like: And so go on with a further Collection: which if the *Method* had been Exact, many would have despaired to attain by Imitation. As for his Lordships love of Order, I can referre any Man to his Lordships Latine Book, *De Augmentis Scientiarum*: which (if my Judgement be any thing) is written in the Exactest Order, that I know any Writing to be. I will conclude with an usuall speech of his Lordships. That this Work of his *Naturall History*, is the *World*, as GOD made it, and not as Men have made it: For that it hath nothing of Imagination.

This Epistle is the same, that should have been prefixed to this Book, if his Lordship had lived.

W. Rawley.

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Books printed for William Lee, *and to be ſold at his Shop, at the* Turks *Head in* Fleetſtreet.

ANnotations upon all the New Teſtament, by *Edward Leigh* Eſq. M^r. of Arts of Magdalen Hall in *Oxford*, in Fol. 1650.

A Treatiſe of Divinity in three Books of the Scriptures of God, and his Atributes, and of the works of God in 4. 1647.

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The { Magnetick cure of Wounds, / Nativity of Tartar in Wine, / Image of God in Man.

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The Roman Foot and Denaries, from whence as from two principles, the meaſure and waights may be deduced, by *John Grtaves* of *Oxford.* 8. 1647.

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The Spaniſh Gallant, Inſtructing men in their carriage to be beloved of the people in 12.

Youths Behaviour or Decency in converſation amongſt men; with new additions of a Diſcourſe againſt Powdering of haire, Black patches and Naked breaſts. 8. 1651.

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Books printed for W. Lee, (*and ſome others*) *and are to be ſold at the* Turks *Head in* Fleetſtreet.

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A Sixfold Commentary upon *Geneſis*, wherein Six ſeverall Tranſlations are compared, by *Andrew Willet.* in Fol.

The Theater of Plants, or a large Herball, by *John Perkinſon* Apothecary.

Orlando Furioſo Engliſhed by S^r. *John Harrington*, with the Tranſlators addition of his Epigrams. in Fol.

Mare Clauſum, by *John Selden* Eſq. of the beſt Impreſſion, in Fol.

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Reports or new Caſes of Law, by *John March* of *Grayes Inne*, Barreſter. 4. 1648.

The Attournies Academy, being the manner of proceedings in all the Courts of Records at *Weſtminſter* and other Courts of Law or Equity. 4. 1647.

Three Learned Readings, 1 by the L. *Dyer.* 2 by S^r. *I. Brograve.* 3 by *Thomas Riſden* Eſq.

The Learned Argument upon the Writ of *Habeas Corpus*, in Court of the Upper Bench, with the opinion of the Court thereupon.

The Touchſtone of Common Aſſurances, by *W. Sheppard* Eſq. of the middle Temple 4. 1648.

The Book of oathes; and the ſeverall Formes thereof, both Ancient and Modeene. in 8. 1649.

Fleta, an Ancent Manuſcript of the Laws of England, publiſhed in print, by *John Selden* Eſq. and is to be ſold by *W. Lee, M. Walbancke*, and *D. Pakeman.* 4. 1647.

Books

Books printed for W. Lee, D. Pakeman, *and* G. Bedell, *and are to be ſold at their Shops in* Fleetſtreet.

Biblia Sacra ſive Teſtamentum vet^{s}. Ab *Im. Tremellio & Fra. Iunio* ex Hebræo Latinè redditum, & Teſtamentum novum, à *Theod. Beza* è Græco in Latinum verſum. *Argumentis Capitum additis verſibuſq; ſingulis diſtinctis, & ſeorſum expreſſis.* Cum Indice. in 12. 1640.

The Hiſtory of the Civill Wars of *France*, written in *Italian* by *H. C. Davila.* Tranſlated out of the Originall. Fol. 1647.

De Priſcis Anglorum Legibus, being the Ancient Laws of England, in Saxon and Latin, out of the Author (M^{r}. *Lamberts*) owne Manuſcript Copy. 1645.

Divine Eſſayes, by the Honourable *Walter Mountague* Eſq. 4. 1648.

Reports or Caſes in Chancery, Collected by S^{r}. *George Cary*, one of the Maſt. of the Chancery.

The whole office of a County Juſtice of Peace, with an abridgement of all the Acts and Ordinances, which any waies concerne a Juſtice of Peace. 1650.

The Compleat Lawyer.

A perfect abridgement of the Eleaven Books of Reports of the Reverend and Learned Knight, S^{r}. *Edward Coke*, ſometimes Chiefe Juſtice of the the Upper Bench, written in *French* by S^{r}. *John Davis* and now Engliſhed. 1651.

The Hiſtory of the Life and Raigne of *Richard* the Third, by *Geor. Buck*, Eſq. Fol. 1646.

The office and Duty of Executors.

The Grounds and Maxims of the Laws of England by *W. Noy* Eſq. both printed for *W. L. D.P.* and others.

Theſe Books following are to be ſold by W. Lee, *and* D. Pakeman *at their Shops in* Fleetſtreet.

A Collection of all the Statutes, frequent in uſe, with Notes in the margent and references to the Book Caſes, with an abridgement of the Reſidue which be Expired, or Repealed, by *Ferdinando Pulton* of *Lincolns Inne*, in large Fol. 1640.

The firſt part of the Inſtitutes of the Laws of England, or a Comnentary upon *Littleton.*

The Second part of the Inſtitutes containing the Expoſition of many Ancient, and other Statutes of *Magna Charta.*

The Third part of the Inſtitutes, Concerning Pleas of the Crown and Criminall Cauſes.

The Fourth part of the Inſtitutes, Concerning the Juriſdiction of Courts: all written by *Ed. Coke Milite* ſometimes Chiefe Juſtice of the Upper Bench. Fol. 1648.

The Reports of that Reverend and Learned Judge S^{r}. *Henry Hobart* L. Chiefe Juſtice of the Common Pleas, being inlarged and perfected by his owne Copy. in Fol. 1650.

The 1, 2, 3, 4. 6, 7, & 11 Parts of the Reports, of my L. *Coke.* in Fol.

The Abridgement of my L. *Cokes* 11. Reports, by *Edw. Tratman.* 8.

The yeare Book of *Edward* the 4th: alſo, Long *quinto* of *Edward* the 4th. both Fol.

The Regiſter of Writs. Fol. 1634.

Henric. de Bracton, de Legibus, & Conſuetudinibus Angliæ. 4. 1640.

Preſidents the Firſt and Second part by *W. Weſt.* in large 4.

Crumptons Juriſdiction of Courts. 4.

The Elements of the Laws of England, by S^{r}. *Francis Bacon*, ſometime L. Chancellor of England. 4. 1639.

The Judges Arguments about Shipmony. 4.

Natura Brevium, by *Fitz-Herbert.*

The Office of Sheriffes, by *Wilkinſon.* 8.

Four Books of Law, by S^{r}. *Henry Finch.* 8.

Doctor and Student. 8.

A Book of Preſidents. 8.

Littleton and *Perkins*, together or ſingle. in 16.

The Compleat Copyholder, with the Reading of Copyholds, the firſt by S^{r}. *Edward Coke*, the ſecond, by *Charles Calthrop.* Eſq. 4.

The order of keeping of a Court Leet, and Court Baron. 4.

A Little Treatiſe of Baile and Mainepriſe, by *E. C.* Knight.

A Declaration of Nuſance, concerning dwelling Houſes, with the Reſolutions of the Judges of Aſſiſes upon queſtions touching Pariſhes.

Speciall and Selected Law Caſes, out of the Reports, and Yeare Books, concerning the perſons and eſtates of all men whatſoever.

Analecta formerly called the Country Juſtice, the 6 Edition, carefully and truly corrected from the groſs Errors of the former Impreſſions. in 12. 1648.

Statuta Pacis containing all the Statutes, in order of time as concern a Juſtice of Peace. in 12.

Kelaways Reports. Fol.

The Laws Reſolution concerning Womens Writs. in 4.

The Engliſh Lawyer, by Judge *Dodridge.* 4.

Viceſimo Primo Iacobi, & Primo & Tertio Caroli. Fol.

NATU-

NATVRALL HISTORIE.

I. Century.

DIgge a *Fit* upon the *Sea-ſhore*, ſomewhat above the High-water Marke, and ſinke it as deepe as the Low water Marke; And as the *Tide* commeth in, it will fill with *Water*, Freſh and Potable. This is commonly practiſed upon the Coaſt of *Barbary*, where other freſh *Water* is wanting. And *Caſar* knew this well, when he was beſieged in *Alexandria*: For by digging of *Pits* in the *Sea-ſhore*, hee did fruſtrate the Laborious Workes of the Enemies, which had turned the *Sea-water* upon the Wells of *Alexandria*; And ſo ſaved his Army, being then in Deſperation. But *Caſar* miſtooke the Cauſe, For he thought that all *Sea-ſands* had Naturall Springs of *Freſh Water*. But it is plaine, that it is the *Sea-water*; becauſe the Pit filleth according to the Meaſure of the *Tide*: And the *Sea-water* paſſing or Straining through the Sands, leaveth the Saltneſſe.

Experiments in *Conſort*, touching the Straining and Paſſing of Bodies, one through another: which they call *Percolation*.

1.

I remember to have read, that Triall hath been made of *Salt-water* paſſed through *Earth*, through ten Veſſels, one within another, and yet it hath not loſt his Saltneſſe, as to become potable: But the ſame Man faith, that (by the Relation of Another) *Salt-water* drayned through twenty Veſſels, hath become Freſh. This *Experiment* ſeemeth to croſſe that other of *Pits*, made by the *Sea-ſide*, and yet but in part, if it be true, that twenty Repetitions doe the effect. But it is worth the Note, how poore the Imitations of Nature are, in common courſe of *Experiments*, except they be led by great Judgement, and ſome good Light of *Axiomes*. For firſt, there is no ſmall difference between a Paſſage of *Water* through twenty ſmall Veſſels; And through ſuch a diſtance, as between the Low-water and High-water Mark. Secondly, there is a great difference between Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And beſides, Earth doth not ſtrain the Water ſo finely, as Sand doth. But there is a third Point, that I ſuſpect as much, or more than the other Two; And that is, that in the *experiment* of *Tranſmiſſion* of the *Sea water* into the *Pits*, the *Water* riſeth; But in the *experiment* of tranſmiſſion of the *Water* through the Veſſels, it falleth: Now certain it is, that the Salter part of *Water*, (once

2.

Salted throughout) goeth to the Bottome. And therefore no marvaile, if the Drayning of *water* by deſcent, doth not make it freſh: Beſides, I doe ſomewhat doubt, that the very Daſhing of the *water*, that commeth from the Sea, is more proper to ſtrike off the Salt part, than where the *water* ſlideth of her owne Motion.

3. It ſeemeth *Percolation* or *Tranſmiſſion*, (which is commonly called *Straining*) is a good kinde of *Separation*, Not onely of Thick from Thin, and Groſſe from Fine; But of more ſubtile Natures; And varieth according to the Body through which the *Tranſmiſſion* is made. As if through a woollen Bag, the Liquor leaveth the Fatneſſe; If through Sand, the Saltneſſe, &c. They ſpeak of Severing Wine from Water; paſſing it through Ivie wood, or through other the like porous Body; but *Non conſtat*.

4. The *Gum* of *Trees* (which we ſee to be commonly ſhining and cleare) is but a fine Paſſage or *ſtraining* of the Juyce of the Tree, through the Wood and Barke. And in like manner, *Corniſh Diamonds*, and *Rock Rubies*, (which are yet more reſplendent than *Gums*) are the fine Exudations of *Stone*.

5. *Ariſtotle* giveth the Cauſe, vainly, why the *Feathers* of *Birds* are of more lively Colours, than the *Haires* of *Beaſts*; for no *Beaſt* hath any fine Azure, or Carnation, or Green *Haire*. He ſaith, it is, becauſe *Birds* are more in the Beames of the Sun, than *Beaſts*; but that is manifeſtly untrue; For *Cattle* are more in the Sun than *Birds*, that live commonly in the Woods, or in ſome Covert. The true Cauſe is, that the excrementitious Moiſture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beaſts*, paſſeth in *Birds* through a finer & more delicate Strainer, than it doth in *Beaſts*: For *Feathers* paſſe through Quills; And *Haire* through Skin.

6. The *Clarifying* of *Liquors* by Adheſion is an Inward *Percolation*; And is effected, when ſome Cleaving Body is Mixed and Agitated with the *Liquors*; whereby the groſſer Part of the *Liquor* ſticks to that Cleaving Body; And ſo the finer Parts are freed from the Groſſer. So the *Apothecaries* clarifie their *Syrups* by whites of Eggs, beaten with the Juices which they would clarifie; which whites of Eggs gather all the Dregs and groſſer Parts of the Juice to them; And after the *Syrup* being ſet on the Fire, the whites of Eggs themſelves harden, and are taken forth. So *Ippocraſſe* is clarified by mixing with Milke; And ſtirring it about, And then paſſing it through a Woollen Bag, which they call *Hippocrates Sleeve*, And the Cleaving Nature of the Milk draweth the Powder of the Spices, and groſſer parts of the *Liquor* to it; and in the paſſage they ſtick upon the Woollen bag.

7. The *Clarifying* of *Water*, is an *experiment* tending to Health, beſides the pleaſure of the Eye, when *water* is Cryſtalline. It is effected by caſting in and placing Pebbles, at the Head of a Current; that the *water* may ſtraine through them.

8. It may be, *Percolation* doth not onely cauſe Clearneſſe and Splendour, but Sweetneſſe of Savour; For that alſo followeth, as well as Clearneſſe, when the Finer Parts are ſevered from the Groſſer. So it is found, that the Sweats of Men that have much Heat, and exerciſe much, and have cleane Bodies, and fine Skins, doe ſmell ſweet; As was ſaid of *Alexander*; And we ſee, commonly, that *Gums* have ſweet Odours.

Experiments in *Conſort* touching *Motion* of *Bodies* upon their *Preſſure*.

9. TAke a *Glaſſe*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the Glaſſe, preſſing it ſomewhat hard; And after you have drawn it ſome few times about, it will make the Water friske and

and ſprinkle up, in a fine Dew. This *Inſtance* doth excellently Demonſtrate the Force of *Compreſſion* in a Solid Bodie. For whenſoever a Solid Body (as Wood, Stone, Metall, &c.) is preſſed, there is an inward Tumult in the parts thereof, ſeeking to deliver themſelves from the Compreſſion: And this is the Cauſe of all *Violent Motion*. Wherein it is ſtrange in the higheſt Degree, that this *Motion* hath never been obſerved, nor inquired; It being of all *Motions*, the moſt Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at firſt, by way of Proofe, and Search, which way to deliver it ſelfe; And then worketh in Progreſſe, where it findeth the Deliverance eaſieſt. In *Liquors* this *Motion* is viſible: For all Liquors ſtrucken make round Circles, and withall Daſh, but in *Solids*, (which break not) it is ſo ſubtile, as it is inviſible; but nevertheleſſe bewrayeth it ſelfe by many effects; as in this *Inſtance* whereof we ſpeake. For the *Preſſure* of the Finger furthered by the wetting (becauſe it ſticketh ſo much the better unto the Lip of the *Glaſſe*) after ſome continuance, putteth all the ſmall Parts of the *Glaſſe* into worke; that they ſtrike the *Water* ſharply; from which *Percuſſion* that Sprinkling cometh.

10. If you ſtrike or pierce a *Solid Body*, that is Brittle, as *Glaſſe*, or *Suger*, it breaketh not onely, where the immediate force is; but breaketh all about into ſhivers and fitters; The *Motion*, upon the *Preſſure*, ſearching all wayes, and breaking where it findeth the *Body* weakeſt.

11. The *Powder* in *Shot* being Dilated into ſuch a *Flame*, as endureth not *Compreſſion*, Moveth likewiſe in round, (the *Flame* being in the Nature of a *liquid Body*:) Sometimes recoyling, Sometimes breaking the *Piece*; But generally diſcharging the *Bullet*, becauſe there it findeth eaſieſt Deliverance.

12. This *Motion* upon *Preſſure*, and the Reciprocall thereof, which is *Motion* upon *Tenſure*; we uſe to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimenſion, delivereth and reſtoreth it ſelf to the Naturall: As when a *Blowne Bladder* (Preſſed) riſeth againe; or when *Leather* or *Cloth* tentured ſpring back. Theſe two *Motions* (of which there be infinite Inſtances) we ſhall handle in due place.

13. This *Motion* upon *Preſſure* is excellently alſo demonſtrated in *Sounds*. As when one Chimeth upon a *Bell*, it ſoundeth; But as ſoone as he layeth his hand upon it, the *Sound* ceaſeth: And ſo, the *Sound* of a *Virginall String*, as ſoone as the Quill of the Jack falleth from it, ſtoppeth. For theſe *Sounds* are produced, by the ſubtile Percuſſion of the Minute parts of the *Bell*, or *String*, upon the Aire; All one, as the *Water* is cauſed to leape by the ſubtile Percuſſion of the Minute parts of the *Glaſſe*, upon the Water, whereof we ſpake a little before in the ninth *Experiment*. For you muſt not take it to be, the locall *ſhaking* of the *Bell*, or *String* that doth it. As we ſhall fully declare, when we come hereafter to handle *Sounds*.

Experiments in Conſort touching *Separations* of *Bodies by weight*.

14. TAke a *Glaſſe* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take alſo another *Glaſſe*, whereinto put *Claret Wine* and *Water* mingled; Reverſe the firſt *Glaſſe*, with the *Belly* upwards, Stopping the *Neb* with your finger; Then dip the Mouth of it within the Second *Glaſſe*, and remove your Finger: Continue it in that poſture for a time; And it will unmingle the *Wine* from the *Water*: The *Wine* aſcending & ſetling in the top of the upper *Glaſſe*; And the *Water* deſcending and ſetling in the bottome of the lower *Glaſſe*. The paſſage is apparent to the Eye; For

you ſhall ſee the *Wine*, as it were, in a ſmall veine, riſing through the *Water*. For handſomneſſe ſake (becauſe the Working requireth ſome ſmall time) it were good you hang the upper *Glaſſe* upon a Naile. But as ſoon as there is gathered ſo much pure and unmixed *Water* in the Bottom of the Lower *Glaſſe*, as that the Mouth of the Upper *Glaſſe* dippeth into it, the *Motion* ceaſeth.

15. Let the Upper *Glaſſe* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Upper *Glaſs* be *Water* pure, the Lower *Water* coloured; or contrariwiſe; there followeth no *Motion* at all. But it hath been tried, that though the Mixture of *Wine* and *Water*, in the Lower *Glaſs*, be three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This *Separation* of *Water* & *Wine* appeareth to be made by *Weight*; for it muſt be of *Bodies* of unequall *Weight*, or elſe it worketh not; And the Heavier *Body* muſt ever be in the upper *Glaſs*. But then note withall, that the *Water* being made penſile, and there being a great *Weight* of *Water* in the *Belly* of the *Glaſs*, ſuſtained by a ſmall Pillar of *Water* in the Neck of the *Glaſs*; It is that, which ſetteth the *Motion* on worke: For *Water* and *Wine* in one *Glaſs*, with long ſtanding, will hardly ſever.

16. This *Experiment* would be Extended from Mixtures of ſeverall *Liquors*, to *Simple Bodies*, which Conſiſt of ſeverall Similar Parts: Try it therefore with *Broyn* or *Salt-water*, and *Freſh-water*: Placing the *Salt-water* (which is the heavier) in the upper *Glaſs*; And ſee whether the *Freſh* will come above. Trie it alſo with *Water thick Sugred*, and *Pure Water*; and ſee whether the *Water* which cometh above, will loſe his Sweetneſſe: For which purpoſe it were good there were a little Cock made in the Belly of the upper *Glaſſe*.

Experiments in Conſort touching *Iudicious* and *Accurate Infuſions*, both in *Liquors*, and *Aire*.

17. IN *Bodies* containing Fine Spirits, which doe eaſily diſſipate, when you make *Infuſions*, the Rule is; A ſhort Stay of the *Body* in the *Liquor* receiveth the Spirit; And a longer Stay confoundeth it; becauſe it draweth forth the Earthy Part withall; which embaſeth the finer. And therefore it is an Errour in *Phyſitians*, to reſt ſimply upon the Length of ſtay, for increaſing the vertue. But if you will have the *Infuſion* ſtrong, in thoſe kind of *Bodies* which have fine Spirits, your way is, not to give Longer time, but to repeat the *Infuſion* of the *Body* oftner. Take *Violets*, and infuſe a good Pugill of them in a Quart of Vineger; Let them ſtay three quarters of an houre, and take them forth; And refreſh the *Infuſion* with like quantity of new *Violets*, ſeven times; And it will make a Vineger ſo freſh of the *Flower*, as if a Twelve month after, it be brought you in a Saucer, you ſhall ſmell it before it come at you. Note, that it ſmelleth more perfectly of the Flower, a good while after, than at firſt.

18. This Rule, which we have given, is of ſingular uſe, for the Preparations of *Medicines*, and other *Infuſions*. As for Example; the Leafe of *Burrage* hath an Excellent Spirit, to repreſſe the fuliginous Vapour of Dusky Melancholy, and ſo to cure Madneſſe: But nevertheleſſe, if the Leafe be infuſed long, it yeildeth forth but a raw ſubſtance, of no Vertue: Therefore I ſuppoſe, that if in the Muſt of Wine, or Wort of Beere, while it worketh, before it be Tunned, the *Burrage* ſtay a ſmall time, and be often changed with freſh; It will make a Soveraigne Drinke for Melancholy Paſſions. And the like I conceive of *Orenge Flowers*.

19. *Rubarb* hath manifeſtly in it Parts of contrary Operations: Parts that purge, and parts that bind the body: and the firſt lay looſer, and the latter lay deeper:

deeper: So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and bind the Body lesse after the purging, than if it stood twenty foure houres; This is tried: But I conceive likewise, that by Repeating the *Infusion* of *Rubarb*, severall times, (as was said of Violets) letting each stay in but a small time; you may make it as strong a *Purging Medicine*, as *Scammony*. And it is not a small thing won in *Physick*, if you can make *Rubarb*, and other *Medicines* that are *Benedict*, as strong Purgers, as those that are not without some Malignity.

20. *Purging Medicines*, for the most part, have their *Purgative* Vertue, in a fine Spirit; As appeareth by that they endure not boyling, without much losse of vertue. And therefore it is of good use in *Physick*, if you can retaine the *Purging* Vertue, and take away the Unpleasant taste of the *Purger*, which it is like you may doe, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Tast, is in the Grosser part.

21. Generally, the working by *Infusions*, is grosse and blinde, except you first trie the Issuing of the severall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leave that Quality, which you desire. This to know, there be two wayes; The one to trie what long stay, and what short stay worketh, as hath been said: The other to trie in Order, the succeeding *Infusions*, of one and the same Body, successively, in severall *Liquors*. As for example; Take *Orenge-Pils*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *Infuse* halfe an houre in *Water*: Then take them out; and *Infuse* them againe in other *Water*; And so the third time: And then tast and consider the *First Water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weakenesse, but otherwise in Tast, or Odour; For it may be the *First water* will have more of the Sent, as more Fragrant; And the *Second* more of the Tast, as more bitter or Biting, &c.

22. *Infusions* in *Aire*, (for so we may well call *Odours*) have the same diversities with *Infusions* in *Water*; In that the severall *Odours* (which are in one Flower, or other Body) issue at severall times; Some earlier, some later: So we find that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleasing Sent, that cometh forth first; But soone after an ill Sent quite differing from the Former. Which is caused, not so much by Mellowing, as by the late Issuing of the Grosser Spirit.

23. As we may desire to extract the finest Spirits in some Cases; So we may desire also to discharge them (as hurtfull) in some other. So *VVine burnt*, by reason of the Evaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseth some of his poysonous Quality, if it be vapoured out, mingled with *Spirit* of *VVine*, or the like: *Sean* leeseth somewhat of his windinesse by Decocting; And (generally) subtile or windy Spirits are taken off by Incension, or Evaporation. And even in *Infusions* in things that are of too high a Spirit, you were better powre off the first *Infusion*, after a small time, and use the latter.

Experiment Solitary, touching the *Appetite* of *Continuation* in *Liquids*.

24. *Bvbbles* are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *VVater* without: And it seemeth somewhat strange, that the *Aire* should rise so swiftly, while it is in the *VVater*; And when it cometh to the top, should be stayed by so weake a Cover as that of the *Bubble* is. But as for the swift Ascent of the *Aire*, while it is under the *VVater*, that is a *Motion* of *Percussion* from the *VVater*; which it selfe descending, driveth up the *Aire*; and no *Motion* of *Levity* in the *Aire*. And this *Democritus*

called *Motus Plagæ*. In this Common *Experiment*, the Cauſe of the Encloſure of the *Bubble* is, for that the Appetite to reſiſt Separation, or Diſcontinuance, (which in ſolid *Bodies* is ſtrong) is alſo in *Liquors*, though fainter and weaker; As we ſee in this of the *Bubble*: we ſee it alſo in little Glaſſes of Spittle that Children make of Ruſhes; And in Caſtles of Bubbles, which they make by blowing into *water*, having obtained a little Degree of Tenacity by Mixture of Soap: We ſee it alſo in the *Stillicides* of *water*, which if there be *water* enough to follow, wil Draw themſelves into a ſmall thred, becauſe they will not diſcontinue; But if there be no Remedy, then they caſt themſelves into round Drops; which is the Figure, that ſaveth the Body moſt from Diſcontinuance: The ſame Reaſon is of the Roundneſſe of the *Bubble*, as well for the Skin of *Water*, as for the *Aire* within: For the *Aire* likewiſe avoideth *Diſcontinuance*; And therefore caſteth it ſelfe into a round Figure. And for the ſtop and Arreſt of the *Aire* a little while, it ſheweth that the *Aire* of it ſelfe hath little, or no Appetite, of Aſcending.

Experiment Solitary, touching the making of *Artificiall Springs*. 25.

THE Rejection, which I continually uſe, of *Experiments*, (though it appeareth not) is infinite; But yet if an *Experiment* be probable in the Work, and of great Uſe, I receive it, but deliver it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Find out a hanging Ground, where there is a good quick Fall of Rain-water. Lay a Half-Trough of Stone, of a good length, three or foure foot deep within the ſame Ground; with one end upon the high Ground, the other upon the low: Cover the Trough with Brakes a good thickneſſe, and caſt Sand upon the Top of the Brakes: You ſhall ſee, (ſaith he) that after ſome ſhowres are paſt, the lower end of the Trough will run like a *Spring* of *water*: which is no marvaile, if it hold, while the Raine-water laſteth; But he ſaid it would continue long time after the Raine is paſt: As if the water did multiply it ſelf upon the Aire, by the help of the Coldneſſe and Condenſation of the Earth, and the Conſort of the firſt Water.

Experiment Solitary, touching the *Venomous Quality* of *Mans Fleſh*. 26.

THE *French*, (which put off the Name of the *French Diſeaſe*, unto the Name of the *Diſeaſe* of *Naples*) doe report, that at the Siege of *Naples*, there were certain wicked Merchants that Barrelled up *Mans fleſh*, (of ſome that had been lately ſlain in *Barbary*) and ſold it for *Tunney*; And that upon that foule and high Nouriſhment, was the Originall of that *Diſeaſe*. Which may well be; For that it is certain, that the *Caniballs* in the *Weſt Indies*, eat *Mans fleſh*; And the *Weſt Indies* were full of the Pocks when they were firſt diſcovered: And at this day the *Mortaleſt poyſons*, practiſed by the *Weſt Indians*, have ſome Mixture of the Blood, or Fat, or Fleſh of *Man*: And divers Witches, and Sorcereſſes, as well amongſt the *Heathen*, as amongſt the *Chriſtians*, have fed upon *Mans fleſh*, to aid (as it ſeemeth) their Imagination, with high and foule Vapours.

Experiment Solitary, touching the *Verſion* and *Tranſmutation* of *Aire* into *Water*. 27.

IT ſeemeth that there be theſe wayes (in likelyhood) of *Verſion* of *Vapours* or *Aire*, into *Water* and *Moiſture*. The firſt is *Cold*; which doth manifeſtly Condenſe; as we ſee in the *Contracting of the Aire* in the *Weather-Glaſſe*; whereby it is a Degree nearer to *Water*. We ſee it alſo in the *Generation of Springs*, which the *Ancients* thought (very probably) to be made by the *Verſion* of *Aire* into *Water*, holpen by the *Reſt*, which the *Aire* hath in thoſe Parts; whereby it cannot diſſipate. And by the *Coldneſſe* of *Rocks*; for there

there *Springs* are chiefly generated. We ſee it alſo in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dewes*, and *Raines*. And the Experiment of Turning *Water* into *Ice*, by Snow, Nitre, and Salt, (whereof we ſhall ſpeak hereafter) would be transferred to the Turning of *Aire* into *Water*. The Second way is by *Compreſſion*; As in *Stillatories*, where the Vapour is turned back, upon it ſelf, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* upon the Covers of *Boyling Pots*: And in the *Dew* towards *Raine*, upon *Marble*, and *Wainſcot*. But this is like to doe no great effect; Except it be upon Vapours, and groſſe *Aire*, that are already very neer in Degree to Water. The Third is that, which may be ſearched into, but doth not yet appeare; which is, by *Mingling* of *moiſt Vapours* with *Aire*; And trying if they will not bring a Returne of more *water*, than the *Water* was at firſt: For if ſo; That Increaſe is a *Verſion* of the *Aire*: Therefore put Water into the Bottom of a *Stillatory*, with the Neb ſtopped; Weigh the *Water* firſt; Hang in the Middle of the *Stillatory* a large *Spunge*; And ſee what Quantity of *Water* you can cruſh out of it; And what it is more, or leſs, compared with the *Water* ſpent; for you muſt underſtand, that if any *Verſion* can be wrought, it will be eaſilieſt done in ſmall Pores: And that is the Reaſon why we preſcribe a *Spunge*. The Fourth way is Probable alſo, though not Appearing; Which is, by *Receiving* the *Aire* into the ſmall *Pores of Bodies*; For (as hath been ſaid) every thing in ſmall Quantity is more eaſie for *verſion*; And Tangible Bodies have no pleaſure in the conſort of *Aire*, but endevour to ſubact it into a more *Denſe Body*: But in *Entire Bodies* it is checked; becauſe if the *Aire* ſhould Condenſe, there is nothing to ſucceed: Therefore it muſt be in *looſe Bodies*, as *Sand*, and *Powder*; which we ſee, if they lie cloſe, of themſelves gather Moiſture.

Experiment Solitary, touching *Helps* towards the *Beauty* & *good Features* of *Perſons*. 28.

IT is reported by ſome of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put young, into ſuch a Cage, or Box, as they cannot riſe to their Stature, but may increaſe in Breadth, or Length, will grow accordingly, as they can get Roome: which if it be true, and faiſible, and that the young *Creature* ſo preſſed, and ſtraightned, doth not thereupon die; It is a Means to produce *Dwarfe Creatures*, and in a very Strange figure. This is certaine, and noted long ſince; That the Preſſure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macrocephali*; which ſhape of the Head, at that time, was eſteemed. And the Raiſing gently of the Bridge of the Noſe, doth prevent the Deformity of a Saddle Noſe. Which obſervation well weighed, may teach a Meanes, to make the Perſons of Men, and Women, in many kinds, more comely, and better featured, than otherwiſe they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Legs, to keep them from falling down too low; And by Stroaking up the Forehead to keep them from being low-foreheaded. And it is a common Practice to ſwathe Infants, that they may grow more ſtraight, and better ſhaped: And we ſee Young Women, by wearing ſtraight Bodies, keep themſelves from being Groſſe and Corpulent.

Experiment Solitary, touching the *Condenſing* of *Aire* in ſuch ſort as it may put on *weight*, & yeild *Nouriſhment*. 29.

ONions, as they hang, will many of them ſhoot forth; and ſo will *Pennyroyall*; and ſo will an Herbe called *Orpin*; with which they uſe, in the Countrey, to trim their Houſes, binding it to a Lath, or Stick, and ſetting it againſt a wall. We ſee it likewiſe, more eſpecially, in the greater

Semper-

Semper-vive, which will put out Branches, two or three yeares: But it is true, that commonly they wrap the Root in a Cloth besmeared with *Oyle*, and renue it once in half a Yeare. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is; For that these *Plants* have a Strong, Dense, and Succulent Moisture, which is not apt to exhale; And so is able, from the old store, without drawing help from the Earth, to suffice the sprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the Times of Putting forth. We see also, that *Stumps* of *Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to trie whether these things, in the Sprouting, doe increase *Weight*; which must be tried, by weighing them before they be hang'd up; And afterwards againe, when they are sprouted. For if they increase not in *Weight*; Then it is no more but this; That what they send forth in the Sprout, they leese in some other Part: But if they gather *Weight*, then it is *Magnale Naturæ*; For it sheweth that *Aire* may be made so to be Condensed, as to be converted into a *Dense Body*; whereas the Race and Period of all things, here above the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also that *Aire* can *Nourish*; which is another great Matter of Consequence. Note, that to trie this, the *Experiment* of the *Semper-vive*, must be made without Oyling the Cloth; For else, it may be, the *Plant* receiveth Nourishment from the Oyle.

Experiment Solitary, touching the *Commixture* of *Flame* & *Aire*, and the *great Force* thereof.

30.

Flame and *Aire* doe not Mingle, except it be in an *Instant*; Or in the *vitall Spirits* of *Vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath been ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus farre it is true: And then (forsooth) it is become another Element; the Forme whereof occupieth more place; And so, of Necessity, followeth a Dilatation: And therfore, lest two Bodies should be in one place, there must needs also follow an Expulsion of the Pellet; Or blowing up of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing else, except it were in very great quantity, will be suffocate with any hard Body, such as a Pellet is; Or the Barrell of a Gun; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the Cause of this so potent a Motion, is the *Nitre*, (which we call otherwise *Salt-Petre*) which having in it a notable Crude and windy *Spirit*, first by the *Heat* of the *Fire* suddenly dilateth it selfe; (and we know that simple *Aire*, being preternaturally attenuated by *Heat*, will make it self Roome, and break, and blow up that which resisteth it.) And secondly, when the *Nitre* hath dilated it self, it bloweth abroad the *Flame*, as an inward Bellowes. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *Wild-fire*, and divers other Inflammable Matters, though they burn cruelly, and are hard to quench, Yet they make no such fiery wind, as *Gunpowder* doth: And on the other side, we see that *Quick-silver*, (which is a most Crude and Watry *Body*) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certain, their *Vitall Spirits* are a Substance Compounded of an *Airy* & *Flamy* Matter; And though *Aire* & *Flame* being free, will not well mingle; yet bound in by a *Body* that hath some fixing, they will. For that you may best see in those two Bodies, (which are their *Aliments*) *Water*, and *Oyle*; For they likewise will not well mingle of themselves, but in the Bodies of *Plants*, and

and *Living Creatures*, they will. It is no marvaile therefore, that a ſmall *Quantity of Spirits*, in the Cels of the Braine, and Cannals of the Sinewes, are able to move the whole Body, (which is of ſo great Maſſe) both with ſo great Force, as in Wreſtling, Leaping; And with ſo great Swiftneſſe, as in playing Diviſion upon the *Lute*. Such is the force of theſe two Natures, *Aire* and *Flame* when they incorporate.

Experiment Solitary, touching the *Secret Nature* of *Flame*. 31.

TAke a ſmall *Wax Candle*, and put it in a Socket, of Braſſe, or Iron; Then ſet it upright in a Porringer full of *Spirit of Wine*, heared: Then ſet both the *Candle*, and *Spirit of Wine*, on fire, and you ſhal ſee the *Flame* of the *Candle*, open it ſelfe, and become foure or five times bigger than otherwiſe it would have been; and appeare in Figure *Globular*, and not in *Pyramis*. You ſhall ſee alſo, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blew towards the Colour of the Outward *Flame* of the *Spirit of Wine*. This is a Noble *Inſtance*, wherein two things are moſt remarkable, The one, that one *Flame* within another quencheth not, but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would ſtill aſcend upwards in one greatneſs, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottom, the higher is the Riſe. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but onely remaineth contiguous; As it cometh to paſſe betwixt Conſiſting Bodies. It appeareth alſo, that the forme of a Pyramis in *Flame*, which we uſually ſee, is meerly by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, cruſheth it, and extenuateth it into that Forme; For of it ſelfe it would be Round: And therefore *Smoak* is in the Figure of a Pyramis Reverſed; For the *aire* quencheth the *Flame*, and receiveth the *Smoak*. Note alſo, that the *Flame* of the *Candle* within the *Flame* of the *Spirit of Wine*, is troubled; And doth not only open and move upwards, but moveth waving, and to and fro: As if *Flame* of his owne Nature (if it were not quenched) would rowle and turne, as well as move upwards. By all which it ſhould ſeem, that the Cœleſtiall Bodies, (moſt of them) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and Deternate, They have Rotation, And they have the Colour and Splendour of *Flame*: So that *Flame* above is Durable, and Conſiſtent, and in his Naturall place; But with us, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Experiment Solitary, touching the *Different force* of *Flame* in the *Midſt* and on the *Sides*. 32.

TAke an *Arrow*, and hold it in *Flame*, for the ſpace of ten pulſes; And when it cometh forth, you ſhall find thoſe Parts of the *Arrow*, which were on the Outſides of the *Flame*, more burned, blacked, & turned almoſt into a Coale; whereas that in the Midſt of the *Flame*, will be, as if the Fire had ſcarce touched it. This is an *Inſtance* of great conſequence for the diſcovery of the Nature of *Flame*; And ſheweth manifeſtly, that *Flame* burneth more violently towards the Sides, than in the Midſt: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked & pent. And therefore the *Peripateticks* (howſoever their opinion of an *Element* of *Fire* above the *Aire* is juſtly exploded) in that Point they acquit themſelves well: For being oppoſed, that if there were a *Sphere* of *Fire*, that incompaſſed the Earth ſo neare hand, it were impoſſible but all things ſhould be burnt up, They anſwer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

It

Experiment Solitary, touching the *Decreaſe* of the *Naturall motion* of *Gravity* in *great diſtance from the Earth*; or *within ſome depth of the Earth.* 33.

IT is affirmed conſtantly by many, as an uſuall Experiment, That a *Lump* of *Vre*, in the *Bottome* of a Mine, will be turned, and ſtirred, by two Mens ſtrength; which if you bring it to the *Top* of the Earth, will aske ſix Mens ſtrength at the leaſt to ſtirre it. It is a Noble *Inſtance*, and is fit to be tryed to the full: For it is very probable, that the *Motion of Gravitie* worketh weakly, both farre from the Earth, and alſo within the Earth: The former, becauſe the Appetite of Union of Denſe Bodies with the Earth, in reſpect of the diſtance, is more dull: The latter, becauſe the Body hath in part attained his Nature, when it is ſome Depth in the Earth. For as for the Moving to a *Point* or Place (which was the Opinion of the *Ancients*) it is a meer Vanity.

Experiment Solitary, touching the *Contraction* of *Bodies* in *Bulk*, by the *Mixture* of the more *Liquid Body* with the more *Solid.* 34.

IT is ſtrange, how the *Ancients* tooke up *Experiments* upon credit, and yet did build great Matters upon them. The Obſervation of ſome of the beſt of them, delivered confidently, is, That a *Veſſel* filled with *Aſhes*, will receive the like quantity of *Water*, that it would have done, if it had been empty. But this is utterly untrue, for the *Water* will not goe in by a Fifth part. And I ſuppoſe, that that Fifth part is the difference of the lying cloſe, or open, of the *Aſhes*; As we ſee that *Aſhes* alone, if they be hard preſſed, will lie in leſſe room: And ſo the *Aſhes* with *Aire* between, lie looſer; and with *Water*, cloſer. For I have not yet found certainly, that the *Water*, it ſelf, by mixture of *Aſhes*, or *Duſt*, will ſhrink or draw into leſſe Roome.

Experiment Solitary, touching the *Making Vines* more *fruitfull.* 35.

IT is reported of credit, that if you lay good ſtore of *Kernels* of *Grapes*, about the *Root* of a *Vine*, it will make the *Vine* come earlier and proſper better. It may be tryed with other *Kernels*, laid about the *Root* of a *Plant* of the ſame kind; As *Figgs*, *Kernels* of *Apples*, &c. The Cauſe may be, for that the *Kernels* draw out of the Earth Juice fit to nouriſh the *Tree*, as thoſe that would be *Trees* of themſelves, though there were no *Root*; But the *Root* being of greater ſtrength, robbeth and devoureth the Nouriſhment, when they have drawne it: As great *Fiſhes* devoure little.

Experiments in Conſort touching *Purging Medicines.* 36.

THe *Operation* of *Purging Medicines*, and the Cauſes thereof, have been thought to be a great Secret; And ſo according to the ſlothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall Vertue*, and a *Fourth Quality*, and the like Shifts of Ignorance. The *Cauſes* of *Purging* are divers; all plaine and perſpicuous, and throughly maintained by Experience. The firſt is, That whatſoever cannot be overcome and digeſted by the *Stomack*, is by the *Stomack*, either put up by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulſion* in the *Stomack*, and *Guts*, other *Parts of the Body* (as the *Orifices* of the *Veins*, and the like) are moved to expell by *Conſent*. For nothing is more frequent than *Motion of Conſent* in the Body of Man. This Surcharge of the *Stomack*, is cauſed either by the *Quality* of the *Medicine*, or by the *Quantity*. The *Qualities* are three; *Extreme Bitter*, as in *Aloes*, *Coloquintida*, &c. *Loathſome* and of horrible taſte; As in *Agarick*, *Black Hellebore*, &c. And of *ſecret Malignity*, and diſagreement towards *Mans Body*, many times not appearing much in the Taſt; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine* that *Purgeth*, and hath neither of the firſt two *Manifeſt Qualities*; it is to be held ſuſpected as a kinde of *Poyſon*; For that it worketh either by *Corroſion*, or by a *ſecret Malignity*, & Enmity to *Nature*: And therefore ſuch *Medicines* are warily to be prepared, and uſed. The *Quantity* of that which is taken, doth alſo cauſe *Purging*; As we ſee in a great *Quantity* of *New Milke* from the Cow; yea and a great *Quantity of Meat*; For

Surfeits

Surfets many times turne to *Purges*, both upwards, and downwards. Therefore we see generally, that the working of *Purging Medicines* cometh two or three houres after the *Medicines* taken, For that the *Stomack* first maketh a proof, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *quantity*.

A second *Cause* is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seen, that *Salt*, or any such thing that is sharp and biting, put into the Fundament, doth provoke the part to expell; And *Mustard* provoketh Sneezing: And any sharp Thing to the Eyes provoketh Tears. And therfore we see that almost all *Purgers* have a kind of *Twiching* and *vellication*, besides the *griping* which commeth of winde. And if this *mordication* be in an over-high Degree, it is little better than the *corrosion* of *poyson*; And it commeth to passe sometimes in *Antimony*; Especially if it be given to bodies not repleat with Humours, for where Humours abound, the Humours save the Parts. 37.

The third *Cause* is *Attraction*: For I doe not deny but that *purging Medicines* have in them a direct Force of *Attraction*; As *Drawing Plasters* have in *Surgery*: And we see *Sage*, or *Betony bruised*, *sneezing-powder*, and other *powders* or *Liquors* (which the *Physitians* call *Errhines*) put into the Nose, draw Flegme, and water from the Head; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the Rheume down by the Palat. And by this Vertue, no doubt, some *Purgers* draw more one Humour, and some another, according to the opinion received: As *Rubarb* draweth Choler; *Sean* Melancholy; *Agarick* Flegme, &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides Sympathy, between the *Purger* & the *Humour*, there is also another Cause, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* worke quicker than others: And they that draw quick, draw onely the Lighter, and more fluide Humours; they that draw slow, work upon the more Tough, and Viscous Humours. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the Lightest part of the Humour away, and leaveth the Masse of Humours more obstinate. And the like may be said of *Worme-wood*, which is so much magnified. 38.

The fourth *Cause* is *Flatuositie*: For wind stirred moveth to expell: And we finde that (in effect) all *Purgers* have in them a raw *Spirit*, or *Winde*; which is the principall Cause of *Tortion* in the *Stomach*, & *Belly*. And therefore *Purgers* leese (most of them) the vertue, by Decoction upon the Fire; And for that Cause are given chiefly in Infusion, Juyce, or Powder. 39.

The fift *Cause* is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *spunge*: So we see that *Taking Cold* moveth loosnesse by Contraction of the skin, and outward Parts; And so doth *Cold* likewise cause Rheumes, and Defluxions from the Head; And some *Astringent Plasters* crush out purulent Matter. This kinde of Operation is not found in many *Medicines*: *Mirabolanes* have it; And it may be the *Barkes of Peaches*; For this Vertue requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the Body (For a pleasing *Astriction* doth rather Binde in the Humours, than Expell them:) And therefore such *Astriction* is found in Things of an Harrish Taste. 40.

The Sixt *Cause* is *Lubrefaction*, and *Relaxation*: As we see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallowes*, *Lettuce*, *Mercuriall*, *Pellitory of the Wall*, and others. There is also a secret vertue of *relaxation* in *Cold*: For the *heat* of the Body bindeth the Parts and Humours together, which 41.

Cold,

Cold, relaxeth: As it is seen in *Vrine*, *Blood*, *Pottage*, or the like; which, if they be *Cold*, Breake, and dissolve. And by this kind of *Relaxation*, *Feare* looseneth the Belly; because the Heat retiring inwards towards the Heart, the Guts and other Parts are relaxed; In the same manner as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42. The Seventh *Cause* is *Abstersion*; which is plainly a *Scouring off*, or *Incision* of the *more viscous Humors*, and making the *Humours* more fluide; And Cutting between them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulenesse. But this *Incision* must be by a *Sharpnesse*, without *Astriction*: which we finde in *Salt*, *Wormwood*, *Oxymel*, and the like.

43. There be *Medicines*, that move *Stooles*, and not *Vrine*, Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stool*, are such as enter not at all, or little into the *Mesentery veines*; But either at the first are not digestible by the *Stomack*, and therefore move immediately downwards to the *Guts*; Or else are afterwards rejected by the *Mesentery Veines*, and so turne likewise downwards to the *Guts*, and of these two kinds are most *Purgers*. But those that move *Vrine*, are such as are well digested of the *Stomack*, and well received also of the *Mesentery veines*, so they come as far as the *Liver*, which sendeth *Vrine* to the *Bladder*, as the *Whey of Blood*: And those *Medicines* being Opening and Piercing, do fortifie the Operation of the *Liver*, in sending downe the wheyey Part of the Bloud to the *Reines*. For *Medicines Vrinative* doe not worke by Rejection, and Indigestion, as *Solutive* doe.

44. There be divers *Medicines*, which in greater *Quantity*, move *Stoole*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantity*, move *Vrine*, and in Smaller, *Stoole*. Of the former sort is *Rubarb*, and some others. The *Cause* is, for that *Rubarb* is a *Medicine*, which the Stomack in a small Quantity doth digest, and overcome, (being not Flatuous, nor Loathsome;) and so sendeth it to the *Mesentery veines*; And so being opening, it helpeth downe *Vrine*: But in a greater Quantity, the *Stomack* cannot overcome it, and so it goeth to the *Guts*. *Pepper* by some of the *Ancients* is noted to be of the second sort; which being in small *Quantity*, moveth winde in the Stomack or Guts, and so expelled by *Stoole*; But being in greater *Quantity*, dissipateth the *Wind*; And it selfe getteth to the *Mesentery veines*; And so to the *Liver*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Experiments in consort touching *Meats* & *Drinks* that are *most nourishing*.

45. WE have spoken of *Evacuating* of the *Body*, we will now speak something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one part that is more Nourishing than an other, As *Graines* and *Roots* nourish more, than the *Leaves*; in so much as the *Order* of the *Foliatanes* was put down by the *Pope*, as finding Leaves unable to Nourish Mans Body. Whether there be that difference in the Flesh of *Living Creatures*, is not well inquired: As whether *Livers*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liver* was a great delicacy; In so much as they had Artificiall means to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceive that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would be a very *Nourishing Broth*: Wee finde also that *Scotch Skinch*, (which is a Pottage of strong Nourishment) is made

made with the *Knees*, and *Sinews* of *Beef*, but long boiled: *Jelly* alſo, which they uſe for a Reſtorative, is chiefly made of *Knuckles* of *Veale*. The *Pulp* that is within the *Craſiſh* or *Crab*, which they ſpice and butter, is more Nouriſhing than the *Fleſh* of the *Crab*, or *Craſiſh*. The *Yolkes* of *Eggs* are clearly more Nouriſhing than the *Whites*. So that it ſhould ſeem, that the Parts of *Living Creatures*, that lie more Inwards, nouriſh more than the Outward Fleſh: Except it be the *Braine*; which the Spirits prey too much upon, to leave it any great Vertue of Nouriſhing. It ſeemeth for the Nouriſhing of Aged Men, or Men in Conſumptions, ſome ſuch thing ſhould be Deviſed, as ſhould be half *Chylus*, before it be put into the Stomach.

Take two large *Capons*; perboyle them upon a ſoft fire, by the ſpace of an houre, or more, till in effect all the Blood be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shanks*, and throw them away. Then with a good ſtrong Chopping-knife, mince the two *Capons*, bones and all, as ſmall as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, ſweet, and well ſeaſoned, of foure Gallons of Beere, of 8. s. ſtrength, new as it cometh from the Tunning; Make in the Kilderkin a great Bung-hole of purpoſe: Then thruſt into it, the Boulter (in which the *Capons* are) drawne out in length; Let it ſteep in it three Dayes, and three Nights, the Bung hole open, to worke; Then cloſe the Bung hole, and ſo let it continue, a Day and a halfe; Then draw it into bottles, and you may drink it well after 3 daies Botteling; And it will laſt ſix weeks (approved) It drinketh freſh, flowreth and mantleth exceedingly; It drinketh not newiſh at all; It is an excellent Drinke for a Conſumption, to be drunke either alone, or Carded with ſome other Beere. It quencheth Thirſt, and hath no whit of windineſſe. Note, that it is not poſſible, that Meat and Bread, either in Broths, or taken with Drinke, as is uſed, ſhould get forth into the veines, and outward Parts, ſo finely, and eaſily, as when it is thus Incorporate, and made almoſt a *Chylus* aforehand. 46.

Triall would be made of the like Brew with *Potado Roots*, or *Burr Roots*, or the *Pith* of *Artichoaks*, which are nouriſhing Meats: It may be tryed alſo, with other fleſh; As *Pheſant*, *Partridge*, *Young Porke*, *Pigge*, *Veniſon*, eſpecially of *young Deere*, &c. 47.

A *Mortreſſe* made with the *Brawne* of *Capons*, ſtamped, and ſtrained, and mingled (after it is made) with like quantity, (at the leaſt) of *Almond Butter*; is an excellent Meat to nouriſh thoſe that are weake; Better than *Blanck-Manger*, or *Jelley*: And ſo is the *Cullice* of *Cocks*, boyled thick with the like Mixture of *Almond Butter*: For the *Mortreſſe*, or *Cullice*, of it ſelf, is more Savory and ſtrong; And not ſo fit for Nouriſhing of weak Bodies; But the *Almonds* that are not of ſo high a taſte as *Fleſh*, doe excellently qualifie it. 48.

Indian Maiz hath (of certaine) an excellent Spirit of Nouriſhment; But it muſt be throughly boyled, and made into a *Maiz-Creame* like a *Barley-Creame*. I judge the ſame of *Rize*, made into a Creame; For *Rice* is in *Turky*, and other Countries of the Eaſt, moſt fed upon; But it muſt be throughly boyled in reſpect of the Hardneſſe of it: And alſo becauſe otherwiſe it bindeth the body too much. 49.

Piſtachoes, ſo they be good, and not muſty, joyned with *Almonds* in *Almond Milk*; Or made into a *Milk* of themſelves, like unto *Almond Milk*, but more green, are an excellent Nouriſher. But you ſhall doe well, to adde a little *Ginger*, ſcraped, becauſe they are not without ſome ſubtill windineſſe. 50.

51. *Milke* warme from the Cow, is found to be a great Nouriſher, and a good Remedy in *Conſumptions*: But then you muſt put into it, when you Milke the Cow, two little bags; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roſes*; For they keep the *Milke* ſomewhat from Turning, or Crudling in the Stomach; And put in Sugar alſo, for the ſame cauſe, and partly for the Taſts ſake; But you muſt drinke a good draught that it may ſtay leſſe time in the Stomach, leſt it Cruddle: And let the Cup into which you milke the Cow, be ſet in a greater Cup of hot water, that you may take it warme. And *Cow-milke* thus prepared, I judge to be better for a *Conſumption*, than *Aſſe-milke*, which (it is true) turneth not ſo eaſily, but it is a little harriſh; Marry it is more proper for Sharpneſſe of Urine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans milke* likewiſe is preſcribed, when all faile; but I commend it not; as being a little too neare the Juyce of Mans Body, to be a good Nouriſher; Except it be in *Infants*, to whom it is Naturall.

52. *Oyle* of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, ſpread upon Bread toſted, is an Excellent Nouriſher; But then to keep the *Oyle* from frying in the Stomach, you muſt drinke a good draught of Milde Beere after it; And to keep it from relaxing the Stomach too much, you muſt put in a little Powder of Cinnamon.

53. The *Yolkes* of *Egges* are of themſelves ſo well prepared by Nature for Nouriſhment; As (ſo they be Potched, or Reare boyled) they need no other Preparation, or Mixture; yet they may be taken alſo raw, when they are new laid, with *Malmeſey*, or *Sweet Wine*; You ſhall doe well to put in ſome few Slices of *Eringium Roots*, and a little *Amber-grice*; For by this meanes, beſides the immediate Facultie of Nouriſhment, ſuch Drinke will ſtrengthen the Back; ſo that it will not draw downe the *Vrine* too faſt; For too much *Vrine* doth alwayes hinder Nouriſhment.

54. *Mincing of Meat*, as in *Pies*, and *Buttered Minced Meat*, ſaveth the Grinding of the Teeth; And therefore, (no doubt) it is more Nouriſhing; Eſpecially in Age; Or to them that have weake Teeth; But the Butter is not ſo proper for weake Bodies; And therefore it were good to moiſten it with a little *Claret Wine*, Pill of *Limon*, or *Orenge*, cut ſmall, *Sugar*, and a very little *Cinnamon*, or *Nutmeg*. As for *Chuetts*, which are likewiſe minced Meat, in ſtead of Butter, and Fat, it were good to moiſten them, partly with *Creame*, or *Almond*, or *Piſtachomilke*; or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reſerve to the due place.

We have hitherto handled the Particulars *which yeeld beſt, and eaſieſt, and plentifulleſt Nouriſhment; And now we will ſpeake of the beſt* Meanes *of Conveying, and Converting the Nouriſhment.*

55. The Firſt *Meanes* is, to procure that the *Nouriſhment* may not be robbed, and drawne away; wherein that, which we have already ſaid, is very Materiall; To provide, that the *Reines* draw not too ſtrongly an over-great Part of the *Blood* into *Vrine*. To this adde that Precept of *Ariſtotle*, that *Wine* be forborne in all *Conſumptions*; For that the *Spirits* of the *Wine*, doe prey upon the Roſcide Juyce of the Body, and inter-common with the Spirits of the Body, and ſo deceive & rob them of their Nouriſhment. And therefore if the *Conſumption* growing from the weakneſſe of the Stomach, doe force you to uſe *Wine*; let it alwaies be burnt; that the Quicker Spirits may evaporate; or at the leaſt quenched with two little wedges of Gold 6 or 7 times repeated. Adde alſo this Proviſion, that there be not too much *Expence*

of

of the *Nouriſhment*, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to ſweat, it muſt be gently reſtrained. But chiefly *Hippocrates* Rule is to be followed, who adviſeth quite contrary to that which is in uſe: Namely, that the *Linnen*, or *Garment* next the Fleſh, be in Winter drie, and oft changed; And in Summer ſeldome changed, and ſmeared over with Oyle; For certaine it is, that any Subſtance that is fat, doth a little fill the Pores of the Body, and ſtay Sweat, in ſome Degree. But the more cleanly way is, to have the *Linnen* ſmeared lightly over, with *Oyle* of *Sweet Almonds*; And not to forbeare ſhifting as oft as is fit.

The Second *Meanes* is to ſend forth the *Nouriſhment* into the *Parts*, more ſtrongly; For which, the working muſt be by *Strengthning* of the *Stomach*; And in this, becauſe the *Stomach* is chiefly comforted by *VVine*, and *Hot things*, which otherwiſe hurt; it is good to reſort to *Outward Applications* to the *Stomach*: Wherein it hath been tried, that the *Quilts* of *Roſes*, *Spices*, *Maſtick*, *VVormwood*, *Mint*, &c. are nothing ſo helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it; And after it be dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the Stomach: For it is certaine, that all Flower hath a potent Vertue of *Aſtriction*; In ſo much as it hardeneth a piece of fleſh, or a Flower, that is laid in it: And therefore a *Bag* quilted with *Bran*, is likewiſe very good; but it drieth ſomewhat too much; and therefore it muſt not lie long. 56.

The Third *Meanes* (which may be a branch of the former) is to ſend forth the *Nouriſhment* the better by *Sleep*. For we ſee, that Beares, and other *Creatures* that *ſleep* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly believed) that *Sleep* doth Nouriſh much; Both for that the Spirits doe leſſe ſpend the Nouriſhment in *Sleep*, than when living *Creatures* are awake: And becauſe (that which is to the preſent purpoſe) it helpeth to thruſt out the Nouriſhment into the Parts. Therefore in Aged men, and weake Bodies, and ſuch as abound not with Choler, a ſhort *Sleep* after dinner doth help to Nouriſh; For in ſuch Bodies there is no feare of an overhaſty Digeſtion, which is the Inconvenience of Poſtmeridian *Sleeps*. *Sleep* alſo in the Morning after the taking of ſomewhat of eaſie Digeſtion; As *Milke* from the Cow, *Nouriſhing Broth*, or the like; doth further Nouriſhment: But this would be done, ſitting upright, that the *Milke* or *Broth* may paſſe the more ſpeedily to the bottome of the Stomach. 57.

The Fourth *Meanes* is to provide that the Parts themſelves may draw to them the Nouriſhment ſtrongly. There is an excellent Obſervation of *Ariſtotle*, That a great reaſon, why *Plants* (ſome of them) are of greater Age, than *Living Creatures*, is, for that they yearly put forth new Leaves, and Boughs; whereas *Living Creatures* put forth (after their Period of Growth) nothing that is young, but Haire and Nailes, which are Excrements, and no Parts. And it is moſt certaine, that whatſoever is young, doth draw Nouriſhment better, than that which is Old; And then (that which is the Myſterie of that Obſervation) young *Boughes*, and *Leaves*, calling the Sap up to them; the ſame Nouriſheth the *Body*, in the Paſſage. And this we ſee notably proved alſo, in that the oft cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Laſting. Transferre therefore this Obſervation to the Helping of Nouriſhment in *Living Creatures*: The Nobleſt and Principall Uſe whereof is, for the *Prolongation* of *Life*, *Reſtauration* of ſome Degree of *Youth*, and *Inteneration* of the *Parts*: For certain it is, that there are in *Living Creatures* Parts that Nouriſh, and Repaire eaſily, And Parts that 58.

Nouriſh and repaire hardly; And you muſt refreſh, and renew thoſe that are eaſie to Nouriſh, that the other may be refreſhed, and (as it were) Drink in Nouriſhment, in the Paſſage. Now we ſee that *Draught Oxen*, put into good Paſture, recover the Fleſh of young Beef; And Men after long Emaciating Diets, wax plump, and fat, and almoſt new: So that you may ſurely conclude, that the frequent and wiſe Uſe of thoſe *Emaciating Diets*, and of *Purgings*; And perhaps of ſome kinde of *Bleeding*; is a principall Means of *Prolongation* of *life*; & *Reſtoring* ſome Degree of *Youth*: For as we have often ſaid, *Death* cometh upon *Living Creatures* like the Torment of *Mezentius*.

Mortua quinetiam jungebat Corpora vivis,
Componens Manibuſque Manus, atque Oribus Ora.

For the Parts in Mans Body eaſily reparable, (as *Spirits*, *Blood*, and *Fleſh*) die in the Embracement of the Parts hardly reparable, (as *Bones*, *Nerves*, and *Membranes*) And likewiſe ſome *Entrails* (which they reckon amongſt the *Spermaticall Parts*) are hard to repaire: Though that Diviſion of *Spermaticall*, and *Menſtruall Parts*, be but a Conceit. And this ſame *Obſervation* alſo may be drawne to the preſent purpoſe of Nouriſhing Emaciated Bodies: And therefore *Gentle Frication* draweth forth the Nouriſhment, by making the Parts a little hungry, and heating them; whereby they call forth Nouriſhment the better. This *Frication* I wiſh to be done in the Morning. It is alſo beſt done by the *Hand*, or a piece of *Scarlet-wooll*, wet a little with *Oyle* of *Almonds*, mingled with a ſmall Quantity of *Bay-ſalt*, or *Saffron*; We ſee that the very Currying of Horſes doth make them fat, and in good liking.

59. The fifth *Meanes* is, to further the very *Act*, of *Aſſimilation* of *Nouriſhment*; which is done by ſome outward *Emollients*, that make the Parts more apt to *Aſſimilate*. For which I have compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The uſe of it would be between Sleeps; For in the latter Sleep the Parts Aſſimilate chiefly.

Experiment Solitary, touching *Filum Medicinale*.

60. THere be many *Medicines*, which by themſelves would doe no Cure, but perhaps Hurt, but being applyed in a certaine Order, one after another, doe great Cures. I have tryed (my ſelfe) a *Remedy* for the *Gout*, which hath ſeldome failed, but driven it away in 24 Houres ſpace: It is firſt to apply a *Pultaſſe*; Of which *vide* the *Receit*: And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaiſter*, *vide* the *Receit*. The *Pultaſſe* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pultaſſe*, Draweth gently; And therefore draweth the Humours out; and doth not draw more to it; For it is a *Gentle Fomentation*, and hath withall a Mixture, (though very little) of ſome *Stupefactive*. The *Plaiſter* is a Moderate *Aſtringent Plaiſter*, which repelleth New Humour from falling. The *Pultaſſe* alone would make the Part more ſoft, and weake; And apter to take the Defluxion and Impreſſion of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultaſſe*, would draw forth little; If too ſtrong, it would draw to the Part, as well as draw from it. The *Plaiſter* alone, would pen the Humour already contained in the Part, and ſo exaſperate it, as well as forbid new Humour. Therefore they muſt be all taken in Order, as is ſaid. The *Pultaſſe* is to be laid to, for two or three Houres: The *Fomentation* for a Quarter of an Houre, or ſomewhat better, being uſed hot, and ſeven, or eight times repeated: The *Plaiſter* to continue on ſtill, till the Part be well confirmed.

There

Experiment Solitary, touching *Cure by Custome.* 61.

THere is a secret Way of *Cure*, (unpractized) By *Assuetude* of that which in it self hurteth. *Poysons* have been made, by some, Familiar, as hath been said. *Ordinary Keepers* of the Sick of the *Plague*, are seldome infected. *Enduring* of *Tortures*, by *Custome*, hath been made more easie. The *Brooking* of Enormous *Quantity* of *Meats*, and so of *Wine* or *Strong Drink*, hath been, by *Custome*, made to be without *Surfeit*, or *Drunkenness*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisicks*, some kinds of *Fluxes*, *Dropsies*, &c. are most dangerous at the first. Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Just Cure of it be not full of perill, And if he find it to be such, let him resort to *Palliation*, And alleviate the *Symptome*, without busying himself too much with the perfect *Cure*. And many times, (if the *Patient* be indeed patient) that Course will exceed all Expectation. Likewise the *Patient* himself may strive, by little and little, to Overcome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment Solitary, touching *Cure by Excesse.* 62.

DIvers *Diseases*, especially *Chronicall*, (such as *Quartain Agues*) are sometimes cured by *Surfeit*, and *Excesses*: As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an Adventitious Strength from Custome, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leave them onely to their first *Cause*; which if it be any thing weak will fall off. Besides, such *Excesses* doe Excite and Spurr *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment Solitary, touching *Cure by Motion of Consent.* 63.

THere is in the Body of Man a great *Consent* in the *Motion* of the severall Parts. We see, it is Childrens sport, to prove whether they can rub upon their Brest with one hand, and pat upon their Fore-head with another; And straight waies they shall sometimes rub with both hands, or pat with both hands. We see, that when the Spirits, that come to the Nosthrils, expell a bad Sent, the Stomach is ready to Expell by Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they die. So in *Pestilent Diseases*, if they cannot be expelled by *Sweat*, they fall likewise into *Loosness*, and that is commonly Mortall. Therefore *Physitians* should ingeniously contrive, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Experiment Solitary, touching *Cure* of *Diseases which are contrary to Predisposition.* 64.

HIppocrates *Aphorisme*, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sex*, *Season of the yeare*, *Diet*, &c. are more dangerous than those that are Concurrent. A Man would think it should be otherwise; For that, when the *Accident of Sickness*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should be more forcible: And so (no doubt) it is; if you suppose like *Quantity* of *Matter*. But that which maketh good the *Aphorisme*, is Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the Contrary. And therefore in *Diseases* of that kinde, let the *Physitian* apply himself more to *Purgation*, than to *Alteration*; Because the offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Experiment Solitary, touching *Preparations* before *Purging*, and *setling* of the *Body* afterward. 65.

Physitians doe wisely prescribe, that there be *Preparatives* used before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body be not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not coming faire away; Which causeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently; Therefore the work of *Preparation* is double; to make the *Humours fluide*, and mature; And to make the *Passages* more open: For both those help to make the Humours passe readily. And for the former of these, *Syrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clysters* also help lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in themselves; because they make the Humours more fluide. But let a *Physitian* beware, how he purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in *ill Places*: For it is certain that there be *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially Passages) doe much mischief. Therefore it is good, after *Purging*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purging*, but *Abstersive* and *Mundifying Clysters* also are good to conclude with, to draw away the Reliques of the Humours, that may have descended to the *Lower Region* of the *Body*.

Experiment Solitary, touching *Stanching of Blood*. 66.

Blood is stanched divers wayes: First by *Astringents*, and *Repercussive Medicines*. Secondly, by *Drawing* of the *Spirits* and *Blood inwards*; which is done by *cold*; As *Iron* or a *Stone* laid to the Neck doth stanch the Bleeding at the Nose; also it hath been tryed, that the *Testicles* being put into sharp Vineger, hath made a sudden Recesse of the Spirits, and stanched Blood. Thirdly, by the *Recesse of the blood by Sympathy*. So it hath been tryed, that the part that bleedeth, being thrust into the Body of a Capon, Sheep, new ript and bleeding, hath stanched *Blood*; The *Blood*, as it seemeth, sucking and drawing up, by similitude of substance, the *Blood* it meeteth with, and so it self going back. Fourthly, by Custome and Time; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could find no means to stanch the *Blood*, either by *Medicine* or *Ligament*; but was faine to have the *Orifice* of the *VVound* stopped by *Mens Thumbs*, succeeding one another, for the space at the least of two Dayes; And at the last the blood by *Custome* onely retired. There is a fifth Way also in use, to let *Blood* in an *Adverse Part*, for a *Revulsion*.

Experiment Solitary, touching *Change* of *Aliments* and *Medicines*. 67.

It helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine* and *Aliment* still. The Cause is, for that *Nature* by continuall Use of any Thing, groweth to a *Sacietie*, and *Dulnesse*, either of *Appetite*, or *VVorking*. And we see that *Assuetude* of *Things Hurtfull* doth make them leese their force to Hurt; As *Poyson*, which with use some have brought themselves to brook. And therefore it is no marvaile, though *Things helpfull* by *Custome*, leese their force to Help; I count *Intermission* almost the same thing with *Change*; For that, that hath been intermitted, is after a sort new.

It

Experiment Solitary, touching *Diets*. 68.

IT is found by Experience, that in *Diets of Guaiacum, Sarza*, and the like, (especially if they be strict) the *Patient* is more troubled in the beginning, than after continuance; which hath made some of the more delicate Sort of Patients, give them over in the midst; Supposing that if those Diets trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets* doe drie up *Humours, Rheums*, and the like; And they cannot Drie up untill they have first attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, untill it be dried up, and consumed. And therefore *Patients* must expect a due time, and not check at them at the first.

Experiments in Consort touching the *Production* of *Cold*.

THE *Producing* of *Cold* is a thing very worthy the Inquisition; both for Use, and Disclosure of Causes. For *Heat* and *Cold* are *Natures* two hands, whereby she chiefly worketh: And *Heat* we have in readinesse, in respect of the *Fire*; But for *Cold* we must stay till it cometh; or seek it in deep Caves, or high Mountaines: And when all is done, we cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farre hotter, than a *Summers Sun*; But *Vaults* or *Hills* are not much Colder than a *Winters Frost*.

69. The first *Meanes* of *Producing Cold*, is that which *Nature* presenteth us withall; Namely, the *Expiring* of *cold* out of the *Inward Parts of the Earth* in *Winter*, when the Sun hath no power to overcome it; the *Earth* being (as hath been noted by some) *Primum Frigidum*. This hath been asserted, as well by Ancient, as by Moderne *Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the discourse in *Plutarch*, (for I take it, that booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Telesius*, who hath renewed the *Philosophy* of *Parmenides*, and is the best of the *Novelists*.

70. The second *Cause* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is Active and Transitive into Bodies Adjacent, as well as *Heat*: which is seen in those things that are touched with *Snow* or *Cold water*. And therefore, whosoever will be an *Inquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice*; Such as they *use for delicacy*, to coole Wine in Summer: Which is a Poore and Contemptible use, in respect of other uses, that may be made of such *Conservatories*.

71. The Third *Cause* is the *Primary Nature* of all *Tangible Bodies*: For it is well to be noted, that all Things whatsoever (*Tangible*) are of themselves *Cold*; Except they have an Accessory *Heat* by *fire, Life*, or *Motion*: For even the *Spirit of Wine*, or *Chymicall Oyles*, which are so hot in Operation, are to the first Touch, *Cold*; And *Aire* it self compressed, and Condensed a little by blowing, is *Cold*.

72. The Fourth *Cause* is the *Density of the Body*; For all *Dense Bodies* are *Colder* than most other *Bodies*; As *Metals, Stone, Glasse*; and they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth, Dense, Tangible*, hold all of the Nature of *Cold*. The Cause is, for that all *Matters Tangible* being *Cold*, it must needs follow, that where the *Matter* is most Congregate, the *Cold* is the greater.

The

73. The Fifth *Cause* of *Cold*, or rather of increase and vehemency of *Cold*, is a *Quick Spirit inclosed in a Cold Body*. As will appeare to any that shall attentively consider of *Nature* in many Instances. We see *Nitre* (which hath a *Quick Spirit*) is Cold; more *Cold* to the Tongue, than a Stone; So *Water* is *Colder* than *Oile*, because it hath a *Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digested than *Water*, yet hath it a duller *Spirit*; So *Snow* is *Colder* than *Water*, because it hath *more Spirit* within it: So we see that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) Increaseth the *Activity* of *Cold*: So some *Insects* which have *Spirit* of *Life*, as *Snakes*, and *Silkworms*, are to the touch, *Cold*. So *Quick-silver* is the *Coldest* of Metals, because it is *fullest of Spirit*.

74. The Sixth *Cause* of *Cold* is *the Chasing and Driving away of Spirits*, such as have some *Degree of Heat*: For the Banishing of the *Heat* must needs leave any Body *Cold*. This we see in the Operation of *Opium*, and *Stupefactives*, upon the Spirits of living Creatures: And it were not amisse to trie *Opium*, by laying it upon the Top of a *Weather-glasse*, to see whether it will contract the *Ayre*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a Body as Glasse, I conceive that *Opium*, and the like, make the *Spirits* flie rather by *Malignity*, than by *Cold*.

75. Seventhly, the same *Effect* must follow upon the *Exhaling or Drawing out of the warme Spirits*, that doth upon the flight of the Spirits. There is an Opinion, that the *Moone* is Magneticall of *Heat*, as the *Sun* is of *Cold* and *Moisture*: It were not amisse therefore to trie it, with *Warm-waters*; The one exposed to the Beames of the *Moone*; the other with some Skreen betwixt the Beames of the *Moone* and the *Water*; As we use to the *Sun* for Shade; And to see whether the former will coole sooner. And it were also good to inquire, what other Meanes there may be, to draw forth the *Exile heat* which is in the *Aire*; for that may be a Secret of great Power to Produce *Cold weather*.

Experiments in Consort touching the *Version* and *Transmutation of Aire into Water*.

WE have formerly set downe the *Meanes of turning Aire into Water*, in the *Experiment* 27. But because it is *Magnale Naturæ*; and tendeth to the subduing of a very great effect; And is also of Manifold use; we will adde some *Instances* in *Consort* that give light thereunto.

76. It is reported by some of the *Ancients*, that *Sailers* have used, every Night, to hang *Fleeces of Wooll* on the sides of their *Ships*, the *Wooll* towards the Water; And that they have crushed fresh Water out of them, in the Morning, for their use. And thus much we have tryed, that a *Quantity* of *Wooll* tyed loose together, being let down into a deep *Well*; And hanging in the *Middle*, some three Fathome from the Water, for a night, in the Winter time; increased in weight, (as I now remember) to a fifth Part.

77. It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certain *Work-men*, in time of *wars* fled into *Caves*; And the Mouth of the *Caves* being stopped by the Enemies, they were famished. But long time after the dead Bones were found; And some Vessels which they had carried with them; And the Vessels full of *Water*; And that *Water*, thicker, and more towards Ice, than Common *Water*: which is a Notable Instance of *Condensation*, and *Induration* by *Burial under Earth*, (in Caves) for long time; And of *version* also (as it should seem) of *Aire into Water*;

if

if any of those vessels were Empty. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunke; you may be sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would be in a *Cave* under *Earth*.

It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *Water* open in a Roome where *Cloves* are kept, it will be drawne drie in 24 houres; Though it stand at some distance from the *Cloves*. In the Countrey, they use many times, in deceit, when their *Wooll* is new shorne, to set some Pailes of *Water* by, in the same Roome; to increase the weight of the *Wooll*. But it may be, that the Heat of the *Wooll*, remaining from the body of the Sheep; or the Heat gathered by the lying close of the *Wooll*, helpeth to draw the watrie Vapour; But that is nothing to the *Version*. 78.

It is reported also credibly, that *Wooll* new shorne, being laid casually upon a *Vessell* of *Verjuyce*, after some time, had drunke up a great part of the *Verjuyce*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (upon the by) to be noted, the *Percolation*, or *Suing* of the *Verjuyce* through the wood; For *Verjuyce* of it self would never have passed thorow the wood: So as, it seemeth, it must be first in a kinde of Vapour, before it passe. 79.

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *Water*, when the *Aire* is not in gross, but subtilly mingled with *Tangible Bodies*, is, (as hath been partly touched before) for that *Tangible Bodies* have an Antipathy with *Aire*; and if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they have drawn it, they will condense it more, and in effect incorporate it; For we see that a *Sponge*, or *Wooll*, or *Sugar*, or a *Woollen-cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquor* higher, and beyond the place where the *Water* or *Wine* cometh. We see also, that *Wood*, *Lute-strings*, and the like, doe swell in *moist Seasons*: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth of Boxes*, and *Opening* of *Wainscot doores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in Water, which will make Wood to Swell: As we see in the Filling of the Chops of Boules, by laying them in Water. But for that part of these *Experiments*, which concerneth *Attraction*, we will reserve it to the proper *Title* of *Attraction*. 80.

There is also a *Version of Aire into Water*, seen in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before & in moist weather: This must be, either by some *Moysture* the Body yeeldeth; Or else by the Moist Aire thickned against the hard body. But it is plain, that it is the latter, For that we see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse; which letteth in no part of the Vapour, and so turneth it back, and thickneth it into Dew. We see also, that *Breathing* upon a *Glasse*, or Smooth body giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew upon the Inside of Glasse-windowes: And the *Frost* it self upon the ground, is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watrie substance: *Dewes* likewise, and *Raine*, are but the Returns of Moist vapours Condensed; The Dew, by the *Cold* onely of the Suns departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*. 81.

It is very probable (as hath been touched) that that, which will turne 82.

Water

Water into *Ice*, will likewiſe turne *Aire* ſome Degree nearer unto *Water*. Therefore trie the *Experiment* of the *Artificiall Turning Water into Ice* (whereof we ſhall ſpeak in another place) with *Aire* in place of *Water*, and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *Water*, than *Water* into *Ice*: Yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that Artificiall *Converſion* of *Water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Months ſpace, or the like.

Experiments in Conſort touching *Indurations of Bodies.*

INduration, or *Lapidification*, of Subſtances more ſoft, is likewiſe another degree of *Condenſation*; And is a great *Alteration* in Nature. The Effecting and Accelerating thereof is very worthy to be inquired. It is effected by three Meanes. The firſt is by *Cold*; whoſe Propertie is to *Condenſe*, and conſtipate, as hath been ſaid. The Second is by *Heat*; which is not proper but by conſequence; For the *Heat* doth attenuate; And by Attenuation doth ſend forth the Spirit and moiſter Part of a Body; And upon that, the more groſſe of the Tangible Parts doe contract and ſerre themſelves together; Both to avoid *Vacuum* (as they call it) And alſo to Munite themſelves againſt the Force of the *Fire*, which they have ſuffered. And the Third is by *Aſſimilation*; when a Hard Body Aſſimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiſcuouſly, are many: As the Generation of *Stones* within the Earth, which at the firſt are but Rude Earth, or Clay: And ſo of *Minerals*, which come (no doubt) at firſt, of Juyces Concrete, which afterward indurate: And ſo of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And ſo the Making of *Brick*, and *Tile*: Alſo the Making of *Glaſſe*, of a certaine Sand, and Brake-Roots, and ſome other Matters: Alſo the *Exudations* of *Rock-Diamonds*, and *Cryſtall*, which harden with time: Alſo the *Induration* of *Bead-Amber*, which at firſt is a ſoft Subſtance; As appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But we will ſpeak of them diſtinctly.

83. For *Indurations* by *Cold*, there be few Trials of it; For we have no ſtrong or intenſe *Cold* here on the Surface of the *Earth*, ſo neare the Beames of the Sun, and the Heavens. The likelieſt Triall is by *Snow* and *Ice*; For as *Snow* and *Ice*, eſpecially being holpen, and their *Cold* activated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may be, it will turne *Wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conſerving Pit* of *Snow*, and *Ice*, (adding ſome quantity of *Salt*, and *Nitre*) a Piece of *Wood*, or a Piece of *Tough Clay*, and let it lie a month, or more.

84. Another Triall is by *Metalline Waters*, which have virtuall *Cold* in them.

Put

Put therefore *Wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And trie whether it will not harden in ſome reaſonable time. But I underſtand it, of *Metalline Waters*, that come by Waſhing, or Quenching; And not of *Strong Waters* that come by diſſolution; for they are too Corroſive to conſolidate.

It is already found, that there are ſome *Naturall Spring-waters*, that will Inlapidate *Wood*; So as you ſhall ſee one piece of *Wood*, whereof the Part above the *Water* ſhall continue *Wood*; And the Part under the *Water* ſhall be turned into a kinde of *Gravelly Stone*. It is likely thoſe *Waters* are of ſome *Metalline Mixture*; But there would be more particular Inquiry made of them. It is certaine, that an *Egge* was found having lien many yeares in the bottome of a Moat, where the Earth had ſomewhat overgrown it; And this Egge was come to the Hardneſſe of a *Stone*; And had the Colours of the White and Yolke perfect: And the Shell ſhining in ſmall graines like Sugar, or Alablaſter. 85.

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Metalls* themſelves are hardened by often *Heating* and *Quenching* in *Cold water*: For *Cold* ever worketh moſt potently upon *Heat* precedent. 86.

For *Induration* by *Heat*, it muſt be conſidered, that *Heat*, by the Exhaling of the Moiſter Parts, doth either harden the Bodie; As in *Bricks*, *Tiles*, &c. Or if the *Heat* be more fierce, maketh the groſſer Part it ſelf, Run and Melt; As in the making of ordinary *Glaſſe*; And in the *Vitrification* of *Earth*, (as we ſee in the Inner Parts of *Furnaces*) And in the *Vitrification* of *Brick*; And of *Metals*. And in the former of theſe, which is the Hardening by baking without Melting, the *Heat* hath theſe degrees; Firſt, it *Indurateth*; and then maketh *Fragile*; And laſtly, it doth *Incinerate*, and *Calcinate*. 87.

But if you deſire to make an *Induration* with *Toughneſſe*, and leſſe Fragilitie; A middle way would be taken; Which is that which *Ariſtotle* hath well noted; but would be throughly verified. It is, to decoct *Bodies* in *Water*, for two or three daies; But they muſt be ſuch bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *Water* will enter, then long Seething, will rather Soften than Indurate them; As hath been tried in *Egges*, &c. Therefore, Softer *Bodies* muſt be put into Bottles; And the Bottles hung into Water ſeething, with the mouths open, above the *Water*; that no *Water* may get in; For by this Meanes, the virtuall *Heat* of the *Water* will enter; And ſuch a *Heat*, as will not make the Body aduſt, or fragile; But the Subſtance of the *Water* will be ſhut out. This *Experiment* we made; and it ſorted thus. It was tryed with a piece of *Free ſtone*, and with *Pewter*, put into the *Water* at large. The *Free-ſtone* we found received in ſome *Water*; For it was ſofter and eaſier to ſcrape, than a piece of the ſame *Stone* kept drie. But the *Pewter* into which no *Water* could enter, became more white, and liker to Silver, and leſſe flexible, by much. There were alſo put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Piece of *Cheeſe*, a Piece of *Chalke*, and a Piece of *Free-ſtone*. The *Clay* came forth almoſt of the Hardneſſe of *Stone*; The *Cheeſe* likewiſe very hard, and not well to be cut: The *Chalke* and the *Free-ſtone* much harder than they were. The Colour of the *Clay* inclined not a whit to the Colour of *Brick*, but rather to white, as in ordinary Drying by the Sun. Note, that all the former Trials were made by a Boyling upon a good hot Fire, renewing the *Water* as it conſumed, with other hot *Water*; But the Boyling 88.

was

was but for twelve houres onely; And it is like that the Experiment would have been more effectuall, if the Boyling had been for two or three dayes, as we preſcribed before.

89. As touching *Aſſimilation*, (for there is a degree of *Aſſimilation* even in Inanimate bodies) we ſee Examples of it in ſome *Stones*, in *Clay-Grounds*, lying neare to the top of the Earth, where *Pebble* is; In which you may manifeſtly ſee divers *Pebbles* gathered together, and a Cruſt of *Cement* or *Stone* between them, as hard as the *Pebbles* themſelves: And it were good to make a Triall of purpoſe, by taking *Clay*, and putting in it divers *Pebble Stones*, thick ſet, to ſee whether in continuance of time, it will not be harder than other *Clay* of the ſame lump, in which no *Pebbles* are ſet. We ſee alſo in Ruines of old Walls, eſpecially towards the Bottome, the *Morter* will become as hard as the *Brick*; We ſee alſo, that the *Wood* on the ſides of *Veſſels* of *Wine*, gathereth a Cruſt of *Tartar*, harder than the *Wood* it ſelf; And Scales likewiſe grow to the *Teeth*, harder than the *Teeth* themſelves.

90. Moſt of all, *Induration* by *Aſſimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no Nouriſhment that the *Tree* receiveth, or that the *living Creature* receiveth, is ſo hard as *Wood*, *Bone*, or *Horne*, *&c.* but is *Indurated* after by *Aſſimilation*.

Experiment Solitary, touching the *Verſion of water into Aire.*

91. THe Eye of the Underſtanding, is like the Eye of the Senſe: For as you may ſee great Objects through ſmall Crannies, or Levels: So you may ſee great *Axiomes* of *Nature*, through ſmall and Contemptible *Inſtances*. The *Speedy Depredation* of *Aire* upon *watry Moiſture*, and *Verſion* of the ſame into *Aire*, appeareth in nothing more viſible, than in the ſudden Diſcharge, or vaniſhing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glaſſe*, or the *Blade* of a *Sword*, or any ſuch Poliſhed Body; Such as doth not at all Detaine, or Imbibe the Moiſture; For the Miſtineſſe ſcattereth and breaketh up ſuddenly. But the like *Cloud*, if it were *Oylie*, or *Fatty*, will not diſcharge; Not becauſe it ſticketh faſter; But becauſe *Aire* preyeth upon *Water*; And *Flame*, and *Fire*, upon *Oyle*; And therefore, to take out a Spot of Greaſe, they uſe a *Coale* upon browne Paper; Becauſe *Fire* worketh upon Greaſe, or *Oyle*, as *Aire* doth upon *Water*. And we ſee *Paper oyled*, or *Wood oyled*, or the like, laſt long moiſt; but *Wet* with *Water*, drie, or putrifie ſooner. The Cauſe is, for that *Aire* medleth little with the *Moiſture* of *Oyle*.

Experiment Solitary, touching the *Force of Vnion.*

92. THere is an Admirable demonſtration, in the ſame trifling *Inſtance* of the *little Cloud* upon *Glaſſe*, or *Gemmes*, or *Blades* of *Swords*, of the *Force of Vnion*, even in the leaſt Quantities, and weakeſt Bodies, how much it conduceth to Preſervation of the preſent Forme; And the Reſiſting of a New. For marke well the diſcharge of that *Cloud*; And you ſhall ſee it ever break up, firſt in the Skirts, and laſt in the Midſt. We ſee likewiſe, that much *Water* draweth forth the Juyce of the Body Infuſed; But little water, is imbibed by the Body: And this is a Principall Cauſe, why in Operation upon *Bodies*, for their *Verſion* or *Alteration*, the Triall in great Quantities, doth not anſwer the Triall in ſmall; And ſo deceiveth many; For that (I ſay) the greater Body, reſiſteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that ſhould ſubdue it.

Experiment Solitary, touching the *Producing of Feathers and Hairs of divers Colours.*

93. WE have ſpoken before, in the fifth *Inſtance*, of the Cauſe of *Orient Colours*, in *Birds*; Which is by the Fineneſſe of the Strainer; we will now endeavour to reduce the ſame *Axiome* to a *Worke*. For this Writing

ting of our *Sylva Sylvarum*, is (to ſpeak properly) not *Naturall Hiſtory*, but a high kind of *Naturall Magick*. For it is not a Deſcription onely of Nature, but a Breaking of Nature, into great and ſtrange Workes. Try therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their Down; Or of *Whelps*, cutting their Haire as ſhort as may be: Or of ſome other Beaſt; with ſome oyntment, that is not hurtfull to the fleſh; And that will harden, and ſtick very cloſe; And ſee whether it will not alter the Colours of the *Feathers*, or *Haire*. It is received, that the *Pulling* off the firſt *Feathers* of *Birds*, clean, will make the new come forth *White*: And it is certain, that *White* is a penurious Colour, and where moiſture is ſcant. So *Blew Violets*, and other *Flowers*, if they be ſtarved, turn Pale & *White*; *Birds*, and *Horſes*, by Age, or Scarres, turn *White*: and the *Hoare Haires* of Men, come by the ſame reaſon. And therefore in *Birds*, it is very likely, that the *Feathers* that come firſt, will be many times of divers Colours, according to the Nature of the *Bird*; For that the Skinne is more porous; But when the Skin is more ſhut, and cloſe, the Feathers will come *White*. This is a good *Experiment*, not onely for the Producing of *Birds* and *Beaſts* of ſtrange Colours; but alſo, for the Diſcloſure of the Nature of *Colours* themſelves; which of them require a finer Poroſity, and which a groſſer.

Experiments Solitary touching *the Nouriſhment of Living Creatures before they be brought forth.*

IT is a worke of Providence, that hath been truely obſerved by ſome; That the *Yolk* of the *Egge*, conduceth little to the *Generation* of the *Bird*, but onely to the *Nouriſhment* of the ſame: For if a *Chicken* be opened, when it is new hatched; you ſhall find much of the *Yolk* remaining. And it is needfull, that *Birds*, that are ſhaped without the Females Womb, have in the *Egge*, as well Matter of Nouriſhment, as Matter of generation for the Body. For after the *Egge* is laid, and ſevered from the Body of the *Hen*; It hath no more Nouriſhment from the *Hen*; but onely a quickning *Heat* when ſhe ſitteth. But Beaſts, and Men need not the matter of Nouriſhment within themſelves; becauſe they are ſhaped within the Womb of the Female, and are Nouriſhed continually from her Body. 94.

Experiments in Conſort touching *Sympathy and Antipathy for Medicinall uſe.*

IT is an Inveterate and received Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they ſtay on long. It is likewiſe Received, that a kind of *Stone*, which they bring out of the *Weſt-Indies*, hath a peculiar force to move Gravell, and to diſſolve the *Stone*; in ſo much as laid but to the Wreſt, it hath ſo forcibly ſent down Gravell, as Men have been glad to remove it; It was ſo violent. 95.

It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As we ſee, *Going wet-ſhot*, to thoſe that uſe it not, affecteth both: Applications of *hot Pouders* to the *feet* attenuate firſt, and after dry the *Rheume*: And therefore a *Phyſition*, that would be Myſticall, preſcribeth, for the Cure of the *Rheume*, that a Man ſhould walk Continually upon a *Camomill alley*; Meaning, that he ſhould put *Camomill* within his Socks. Likewiſe *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, eaſe the *Head*: And *Sopiriferous Medicines* applyed unto them, provoke *ſleepe*. 96.

It ſeemeth, that as the *Feet* have a Sympathy with the *Head*, So the *Wreſts* and *Hands*, have a Sympathy with the *Heart*: We ſee the affects and Paſſions of the *Heart*, and *Spirits*, are notably diſcloſed by the *Pulſe*: And it is often tryed, that Juices of *Stock-gilly-flowers*, *Roſe-campion*, *Garlick*, and other things; applyed to the *Wreſts*, and renewed; have cured long *Agues*. 97.

And I conceive, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the Hands, *Egges* of *Alablaster*, and *Balls* of *Crystall*.

Of these things we shall speake more, when we handle the Title *of* Sympathy *and* Antipathy, *in the proper place.*

Experiment Solitary touching the *Secret Processes of Nature.*

98. THe Knowledge of man (hitherto) hath been determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Fineness of the Body* it selfe; or the *Smalness of the Parts*; or of the *Subtilty of the Motion*; is little inquired. And yet these be the Things that Governe Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumaticals*, that are in all *Tangible Bodies*, are scarce known. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will have them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will have them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are things by themselves. And then, when they come to Plants and living Creatures, they call them *Soules*. And such Superficiall Speculations they have; Like Prospectives, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in *Nature*. For *Spirits* are nothing else but a *Natural Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are never (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and most of the Effects of *Nature*. For, as we have figured them in our *Sapientiâ Veterum*, in the *Fable* of *Proserpina*, you shall in the Infernall Regiment heare little doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupid things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath given some light, in discerning by their Separations, the *Oyly*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge, that *Herbs* and *Drugs* have divers Parts; As that *Opium* hath a Stupefactive Part, and a Heating Part; The one moving Sleep, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Astringent Parts, &c. But this whole *Inquisition* is weakely and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts of Bodies*, which doe so great Effects, they have not been observed at all; because they are Invisible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seen in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiæ esse convincitur*; *Atomum enim nemo unquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all *Flights* of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be throughly handled in due place,) is not seene

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at all. But nevertheleſſe, if you know it not, or enquire it not attentively and diligently, you ſhall never be able to diſcerne, and much leſſe to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Enclofures of Bodies, whereby the Effects (which were mentioned before) paſſe between the *Spirits*, and the *Tangible Parts*, (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Paſſions*, and ſuch other *Logicall* Words.

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewiſe, that the Effects of *Heat*, are moſt advanced, when it worketh upon a Body, without loſſe or diſſipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is beſt perceived in *Diſtillations*, which are performed in cloſe Veſſels, and Receptacles. But yet there is a higher Degree; For howſoever *Diſtillations* do keepe the Body in Cells, and Cloyſters, without Going abroad, yet they give ſpace unto Bodies to turne into Vapour; To return into Liquour; And to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Liberty: Whereby the true and Ultime Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no ſuch Reciprocation of *Rarefaction*, and of *Condenſation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeves, will turne and change into many *Metamorphoſes*. Take therefore a *Square Veſſell* of *Iron*, in forme of a Cube, and let it have good thicke and ſtrong Sides. Put into it a Cube of *Wood*, that may fill it as cloſe as may be; And let it have a Cover of Iron as ſtrong (at leaſt) as the Sides; And let it be well Luted, after the manner of the *Chymiſts*. Then place the *Veſſell* within burning *Coales* kept quicke kindled, for ſome few houres ſpace. Then take the *Veſſell* from the *Fire*, and take off the Cover, and ſee what is become of the *Wood*. I conceive that ſince all *Inflammation*, and *Evaporation* are utterly prohibited, and the *Body* ſtill turned upon it Selfe, that one of theſe two Effects will follow; Either that the *Body* of the *Wood* will be turned into a kinde of *Amalagma*, (as the *Chymiſts* call it;) Or that the Finer Part will be turned into *Aire*, and the Groſſer ſticke as it were baked, and incruſtate upon the Sides of the *Veſſell*, being become of a Denſer Matter, than the *Wood* it ſelfe, Crude. And for another Triall, take alſo *Water*, and put it in the like Veſſell, ſtopped as before; But uſe a gentler *Heat* and remove the Veſſell ſometimes from the Fire; And againe, after ſome ſmall time, when it is Cold renew the *Heating of it*: And repeat this *Alteration* ſome few times: And if you can once bring to paſſe, that the *Water*, which is one of the Simpleſt of Bodies, be changed in Colour, Odour, or Taſte, after the manner of Compound Bodies, you may be ſure that there is a great Worke wrought in Nature, and a Notable Entrance made into ſtrange Changes of Bodies, and productions: And alſo a Way made to doe that by Fire, in ſmall time, which the Sunne and Age doe in long time. But of the Admirable Effects of this *Diſtillation in Cloſe*, (for ſo we call it) which is like the *Wombes* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; We will ſpeake fully, in the due place. Not that we Aime at the making of *Paracelſus Pigmey's*; Or any ſuch Prodigious Follies; But that we know the Effects of *Heat* will be ſuch, as will ſcarce fall under the Conceit of Man; If the force of it be altogether kept in.

Experiment Solitary touching the *Power of Heat*. 99

Experiments Solitary touching the *Impoſſibility* of *Annihilation.*

100

THere is nothing more Certain in Nature, than that it is impoſſible for any *Body*, to be utterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well ſaid, by an Obſcure Writer of the *Sect* of the *Chymiſts*; that there is no ſuch way to effect the Strange *Tranſmutations* of *Bodies*, as to endevour and urge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained alſo a great Secret of Preſervation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, becauſe no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, becauſe they are utterly Heterogeneall; Nor make a *Round* and *Circulation* within themſelves; they will never change, though they be in their Nature never ſo Periſhable, or Mutable. Wee ſee, how *Flies* and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument* and *Embalming* of the *Body* of any *King*. And I conceive the like will be of *Bodies* put into *Quick ſilver*. But then they muſt be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they have a greater Craſſitude, they will alter in their own Body, though they ſpend not. But of this, Wee ſhall ſpeake more, when we handle the *Title* of *Conſervation* of *Bodies*.

NA-

NATVRALL HISTORIE.

II. Century.

MUSICK in the *Practice*, hath been well pursued; And in good Variety; But in the *Theory*, and especially in the *Yeelding* of the *Causes* of the *Practique*, very weakly; being reduced into certaine Mysticall Subtilties, of no use, and not much Truth. We shall therefore, after our manner, joyne the *Contemplative* and *Active Part* together.

Experiments in Consort touching *Musick*.

All *Sounds* are either *Musicall Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are ever *Equall*; As *Singing*, the *Sounds of Stringed*, and *Wind-Instruments*, the *Ringing of Bels*, &c. Or *Immusicall Sounds*; which are ever *Vnequall*; Such as are the *Voyce in Speaking*, all *Whisperings*, all *Voices of Beasts, and Birds*, (except they be *Singing Birds*) all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins*, (as in *Drums*) and infinite others. 101.

The *Sounds* that produce *Tones*, are ever from such *Bodies*, as are in their Parts and Pores *Equall*; As well as the *Sounds* themselves are *Equall*; And such are the *Percussions* of *Metall*, as in *Bels*; Of *Glasse*, as in the Fillipping of a *Drinking Glasse*; Of *Aire*, as in *Mens voices whilst they Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*, as in the *Nightingals Pipes* of *Regalls*, or *Organs*, and other *Hydraulicks*; which the *Ancients* had and *Nero* did so much esteem, but are now lost. And if any Man think, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created between the *Bow* or *Plectrum*, and the *String*; But between the *String* & the *Aire*; No more than it is between the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that 102.

 create

create *Tones*; *Percuſſion* of *Metals*, (comprehending *Glaſſe*, and the like) *Percuſſions* of *Aire*; and *Percuſſions* of *Water*.

103. The *Diapaſon* or *Eight* in *Muſick* is the ſweeteſt *Concord*, In ſo much, as it is in effect an *Vniſon*; As we ſee in *Lutes*, that are ſtrung in the Baſe *Strings* with two ſtrings, one an *Eight* above another, which make but as one *Sound*. And every *Eight Note* in Aſcent, (as from *Eight* to *Fifteen*, from *Fifteen* to *Twenty two*, and ſo *in infinitum*) are but *Scales of Diapaſon*. The *Cauſe* is dark, and hath not been rendred by any; And therefore would be better contemplated. It ſeemeth that Aire, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been ſaid) admitteth much Variety; As we ſee in the *Voices of Living Creatures*; And likewiſe in the *Voices* of ſeverall *Men*; (for we are capable to diſcerne ſeverall *Men* by their *Voices*) And in the *Conjugation of Letters*, whence *Articulate Sounds* proceed; which of all others are moſt various. But in the Sounds which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to caſt it ſelf into any ſuch variety; But is forced to recurre into one and the ſame Poſture or Figure, onely differing in Greatneſſe and ſmalneſſe. So we ſee *Figures* may be made of lines, Crooked and Straight, in infinite Varietie, where there is Inequality; But *Circles*, or *Squares*, or *Triangles Equilaterall*,) which are all *Figures*, of Equall lines) can differ but in Greater, or Leſſer.

104. It is to be noted (the rather leſt any Man ſhould think, that there is any thing in this *Number* of *Eight*, to create the *Diapaſon*) that this Computation of *Eight*, is a thing rather received, than any true Computation. For a true Computation ought ever to be, by Diſtribution into equall Portions. Now there be intervenient in the *Riſe* of *Eight* (in *Tones*) two *Beemolls*, or *Half-notes*; So as if you divide the *Tones* equally, the *Eight* is but *Seven* whole and equall *Notes*; And if you ſubdivide that into *Half-notes*, (as it is in the Stops of a *Lute*) it maketh the *Number* of *Thirteen*.

105. Yet this is true; That in the ordinary Riſes and Fals of the *Voice* of *Man*, (not meaſuring the *Tone* by whole Notes, and half Notes, which is the Equall Meaſure) there fall out to be two Beemols (as hath been ſaid) between the *Vniſon* and the *Diapaſon*: And this Varying is naturall. For if a Man would endeavour to raiſe or fall his *Voice*, ſtill by *Half notes*, like the Stops of a *Lute*; or by whole *Notes* alone, without *Halfs*; as farre as an *Eight*; he will not be able to frame his *Voice* unto it. Which ſheweth, that after every three whole *Notes* Nature requireth, for all Harmonicall uſe, one *half Note* to be interpoſed.

106. It is to be conſidered, that whatſoever Vertue is in *Numbers*, for Conducing to Concent of *Notes*, is rather to be aſcribed to the *Ante-number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelve*; So that the *Seventh* or the *Thirteenth* is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seventh* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

107. The *Concords* in *Muſick* which are *Perfect*, or *Semiperfect*, between the *Vniſon*, and the *Diapaſon*, are the *Fifth*, which is the moſt *Perfect*; the *Third* next; And the *Sixth* which is more harſh: And as the Ancients eſteemed, and ſo doe my ſelf and ſome Other yet, the *Fourth* which they call *Diateſſeron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and ſo *in Infinitum*, they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* reſpectively from them.

108. For *Diſcords*, the *Second*, and the *Seventh*, are of all others the moſt odious, in *Harmony*, to the *Senſe*; whereof the One is next above the *Vniſon*, the

Other next under the *Diapaſon*: which may ſhew, that *Harmony* requireth a competent diſtance of *Notes*.

In *Harmony*, if there be not a *Diſcord* to the *Baſe*, it doth not diſturb the *Harmony*, though there be a *Diſcord* to the *Higher Parts*; So the *Diſcord* be not of the Two that are Odious; And therefore the ordinary *Concent* of *Four Parts* conſiſteth of an *Eight*, a *Fifth*, and a *Third* to the *Baſe*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cauſe* is, for that the *Baſe* ſtriking more Aire, doth overcome and drown the *Treble*, (unleſſe the *Diſcord* be very Odious) And ſo hideth a ſmall Imperfection. For we ſee, that in one of the *lower Strings* of a *Lute*, there ſoundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but only the *Sound* of the *Baſe*. 109.

We have no *Muſick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we ſee the *Half-Notes* themſelves doe but interpoſe ſometimes. Nevertheleſſe we have ſome *Slides* or *Reliſhes*, of the Voyce, or Strings, as it were continued without *Notes*, from one *Tone* to another, riſing, or falling, which are delightfull. 110.

The Cauſes of that which is *Pleaſing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleaſing* or *Ingrate* to the *Sight*. There be two Things Pleaſing to the Sight (leaving *Pictures*, and *Shapes* aſide, which are but Secondary Objects; And pleaſe or diſpleaſe but in Memory;) theſe two are, *Colours*, and *Order*. The pleaſing of *Colour* ſymbolizeth with the *pleaſing* of any *Single Tone* to the *Eare*; But the pleaſing of *Order* doth ſymbolize with *Harmony*. And therefore we ſee in *Garden-knots*, and the *Frets of Houſes*, and all equall and well anſwering *Figures*, (as *Globes*, *Pyramides*, *Cones Cylinders*, &c.) how they pleaſe; whereas *unequall Figures* are but Deformities. And both theſe *Pleaſures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*, *Good Proportion*, or *Correſpondence*: So that (out of *Queſtion*) *Equality*, and *Correſpondence*, are the *Cauſes* of *Harmony*. But to finde the *Proportion* of that *Correſpondence*, is more abſtruſe; whereof notwithſtanding we ſhall ſpeak ſomewhat, (when we handle *Tones*) in the generall Enquiry of *Sounds*. 111.

Tones are not ſo apt altogether to procure *Sleep*, as ſome other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cauſe* whereof is, for that *Tones*, becauſe they are Equall, and ſlide not, doe more ſtrike and erect the Senſe, than the other. And Overmuch Attention hindreth *Sleep*. 112.

There be in *Muſick* certaine *Figures*, or *Tropes*; almoſt agreeing with the *Figures* of *Rhetorick*, And with the *Affections* of the *Minde*, and other *Senſes*. Firſt, the *Diviſion* and *Quavering*, which pleaſe ſo much in *Muſick*, have an Agreement with the *Glittering* of *Light*; As the *Moon-Beames* playing upon a Wave. Againe, the *Falling* from a *Diſcord* to a *Concord*, which maketh great Sweetneſſe in *Muſick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after ſome diſlikes: It agreeth alſo with the *Taſte*, which is ſoone glutted with that which is ſweet alone. The *Sliding from the Cloſe or Cadence*, hath an Agreement with the *Figure* in *Rhetorick*, which they call *Prater Expectatum*, For there is a Pleaſure even in *being deceived*. The *Reports*, and *Fugs*, have an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Tradaction*. The *Triples*, and *Changing of Times*, have an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Meaſure Time*, are in the *Medley* of one *Dance*. 113.

It hath been anciently held, and obſerved, that the *Senſe of Hearing*, and the *Kindes of Muſick*, have moſt Operation upon *Manners*; As to Incourage Men, 114.

Men, and make them warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and inclin'd to Pity, &c. The *Cauſe* is, for that the *Senſe of Hearing* ſtriketh the *Spirits* more immediately, than the other *Senſes*; And more incorporeally than the *Smelling*: For the *Sight*, *Taſte*, and *Feeling*, have their Organs, not of ſo preſent and immediate Acceſſe to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh alſo immediately upon the *Spirits*, and is forcible while the Object remaineth) it is with a communication of the Breath, or Vapour of the *Object Odorate*: But *Harmony* entring eaſily, and Mingling not at all, and Coming with a manifeſt Motion; doth by Cuſtome of often Affecting the *Spirits*, and Putting them into one kinde of Poſture, alter not a little the Nature of the *Spirits*, even when the Object is removed. And therefore we ſee that *Tunes* and *Aires*, even in their owne nature, have in themſelves ſome Affinitie with the *Affections*; As there be *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens minds to Pity*; *Warlike Tunes*, *&c.* So as it is no Marvell, if they alter the *Spirits*; conſidering that *Tunes* have a Prediſpoſition to the *Motion* of the *Spirits* in themſelves. But yet it hath been noted, that though this variety of *Tunes*, doth diſpoſe the *Spirits* to variety of Paſſions, conforme unto them; yet generally, *Muſick* feedeth that diſpoſition of the *Spirits* which it findeth. We ſee alſo that ſeverall *Aires*, and *Tunes*, doe pleaſe ſeverall *Nations*, and *Perſons*, according to the Sympathy they have with their *Spirits*.

Experiments in Conſort touching *Sounds*; and firſt touching the *Nullity*, and *Entity of Sounds*.

Perſpective hath been with ſome diligence inquired; And ſo hath the *Nature of Sounds*, in ſome ſort, as farre as concerneth *Muſick*. But the *Nature of Sounds* in generall, hath been ſuperficially obſerved. It is one of the ſubtilleſt Pieces of Nature. And beſides, I practiſe, as I doe adviſe; which is, after long Inquiry of Things, Immerſe in Matter, to interpoſe ſome Subject, which is Immateriate, or leſſe Materiate; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

115. It is firſt to be conſidered, what *Great Motions* there are in Nature, which paſſe without *Sound*, or *Noiſe*. The *Heavens* turne about, in a moſt rapide Motion, without *Noiſe* to us perceived; Though in ſome *Dreames* they have been ſaid to make an excellent *Muſick*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, *&c.*) yeeld no *Noiſe*. And if it be thought, that it is the Greatneſſe of diſtance from us, whereby the *Sound* cannot be heard; We ſee that *Lightnings*, and *Corruſcations*, which are neare at hand, yeeld no *Sound* neither. And yet in all theſe, there is a Percuſſion and Diviſion of the *Aire*. The *Windes* in the *Vpper Region* (which move the *Clouds* above (which we call the *Rack*) and are not perceived below) paſſe without *Noiſe*. The *lower Windes* in a Plaine, except they be ſtrong, make no *Noiſe*; But amongſt Trees, the *Noiſe*, of ſuch *Windes* will be perceived. And the *Windes* (generally) when they make a *Noiſe*, doe ever make it unequally, Riſing and Falling, and ſometimes (when they are vehement) Trembling at the Height of their Blaſt. *Raine*, or *Haile* falling, (though vehemently) yeeldeth no *Noiſe*, in paſſing through the *Aire*, till it fall upon the Ground, Water, Houſes, or the like. *Water* in a *River* (though a ſwift Streame) is not heard in the Channel,

but

but runneth in Silence, if it be of any depth. But the very *Streame* upon *Shallowes*, or Gravell, or Pebble, will be heard. And *Waters*, when they beat upon the Shore, or are straitned, (as in the falls of Bridges,) Or are dashed against themselves, by *Windes*, give a Roaring *Noise*. Any *piece of Timber*, or *Hard body*, being thrust forwards by another Body Contiguous, without knocking, giveth no *Noise*. And so *Bodies* in weighing, one upon another, though the *upper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though unobserved,) passeth without *Sound*. For that *Sound*, that is heard somtimes, is produced onely by the Breaking of the *Aire*, And not by the Impulsion of the Parts. So it is manifest, That where the Anteriour Body giveth way, as fast as the Posteriour commeth on, it maketh no *Noise*; be the *Motion* never so great, or swift.

Aire open, and at *large*, maketh no *Noise*, except it bee sharply percussed; As in the *Sound* of a String, where *Aire* is percussed by a hard, and stiffe Body; And with a sharp loose: For if the String be not strained, it maketh no *Noise*. But where the *Aire is pent*, and straitned, there Breath, or other Blowing, (which cary but a gentle Percussion,) suffice to create *Sound*: As in *Pipes*, and *wind-instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concave* of the *Aire*, were it not for the *Fipple*, that straitneth the Aire, (much more then the *Simple Concave*,) would yeeld no *Sound*. For as for other *Wind-instruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters Hornes*, &c. Which appeareth by the blowne-Cheeks of him that windeth them. *Organs* also are blowne with a strong winde, by the Bellowes. And note againe, that some kinde of *Wind-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first entrance; The rather, in respect of their *Traverse*, and *Stop* above the Hole, which performeth the *Fipples* Part; As it is seene in *Flutes*, and *Fifes*, which will not give *Sound*, by a blast at the end, as *Recorders*, &c. doe. Likewise in all *whistling*, you contract the Mouth; And to make it more sharpe, Men sometimes use their Finger.

But in *Open Aire*, if you throw a Stone, or a Dart, they give no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire*: Nor yet *Arrowes*, except they be ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small Whistles*, or *Shepheards Oaten Pipes*, they give a *Sound*, because of their extreame Slenderneſse, whereby the *Aire* is more pent, than in a wider *Pipe*. Againe the *Voices* of *Men*, and Living Creatures, passe through the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the Mouth.

Solide Bodies, if they be *very softly percussed*, give no *Sound*; As when a Man treadeth very softly upon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, give no *Sound*. And *Cart-Wheeles* squeak not when they are liquoured.

The *Flame of Tapers*, or *Candles*, though it be a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire in Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it self, and is repercussed, yet it is without *Noise*.

Flame percussed by Aire, giveth a *Noise*; As in blowing of the Fire by Bellowes; Greater, than if the Bellowes should blow upon the *Aire* it selfe: And so likewise *Flame Percussing the Aire strongly*, (as when Flame suddenly taketh and openeth,) giveth a *Noise*, So great *Flames*, whiles the one impelleth the other, give a bellowing *Sound*.

There

120 There is a Conceit runneth abroad, that there should be a *White Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may cause secret Murthers. But it seemeth to me unpossible; For, if the *Aire pent*, be driven forth, and strike the *Aire open*, it will certainly make a *Noise*. As for the *white Powder*, (if any such thing bee, that may extinguish, or dead the *Noise*,) it is like to bee a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may bee extinguished, or deaded, by discharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more divided *Sounds*: As if you should make a Crosse Barrell hollow, thorow the Barrell of a Peece, it may be, it would give severall Sounds, both at the Nose, and at the Sides. But I conceive, that if it were possible, to bring to passe, that there should be no *Aire* pent at the Mouth of the Peece the Bullet might flie with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh upon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath been oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made by taking some small *Concave* of *Minall*, no more than you meane to fill with Powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

121 I heard it affirmed by a Man, that was a great Dealer in Secrets, but hee was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to have killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning Glasse* when she walked in *Saint Iames* Parke, from the Leads of the House. But thus much (no doubt) is true; That if *Burning Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Navy*,) the *Percussion* of the *Aire* alone, by such a *Burning-Glasse*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings* without *Thunders*.

122 I suppose that *Impression* of the *Aire* with *Sounds*, asketh a time to bee conveighed to the *Sense*; As well as the *Impression* of *Species visible*. Or else they will not be heard. And therefore, as the Bullet *moveth so swift*, that it is *Invisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For wee see, that the Apprehension of the *Eye*, is quicker then that of the *Eare*.

123 All *Eruptions* of *Aire*, though small and slight, give an *Entitie of Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay salt*, and *Bay-leaves* cast into the Fire; So in *Chesnuts*, when they leape forth of the Ashes; So in *Greene Wood* laid upon the Fire, especially, *Roots*; So in *Candles* that spit Flame, if they be wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose leafe* gathered together into the fashion of a Purse, and broken upon the Forehead, or Backe of the Hand, as Children use.

Experiments In Consort touching *Production*, *Conservation*, and *Delatiō of Sounds*; And the *office* of the *Aire* therein.

124 THe *Cause* given of *Sound*, that it should be an *Elision* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting* or *Dividing*, or else an *Attennating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit upon a few Instances; As the Manner is in the *Philosophy* Received. And it is common with Men, that if they have gotten a Pretty *Expression* by a *Word* of *Art*, that *Expression* goeth currant; though it be empty of *Matter*. This Conceit of *Elision*, appeareth most manifestly

to

to be false, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, sometime, after the *Percussion*; but ceaseth straight-waies, if the *Bell*, or *String* be touched and stayed: whereas, if it were the *Elision* of the *Aire*, that made the *Sound*, it could not bee, that the Touch of the *Bell*, or *String*, should extinguish so suddenly that Motion, caused by the *Elision* of the *Aire*. This appeareth yet more manifestly, by *Chiming* with a Hammer, upon the Out-side of a *Bell*; For the *Sound* will be according to the inward Concave of the *Bell*; whereas the *Elision*, or *Attenuation* of the *Aire* cannot be but onely betweene the Hammer and the Out-side of the *Bell*. So againe, if it were an *Elision*, a broad *Hammer*, and a *Bodkin*, struck upon Metall, would give a divers *Tone*; as well as a divers Loudnesse: But they doe not so; For though the *Sound* of the one be *Louder*, and of the other *Softer*, yet the Tone is the same. Besides, in *Eccho's* (whereof some are as loud as the *Originall* Voice,) there is no new *Elision*, but a *Repercussion* onely. But that which convinceth it most of all, is; that *Sounds* are generated, where there is no *Aire* at all. But these and the like Conceits, when Men have cleared their understanding, by the light of Experience, will scatter, and breake up like a Mist.

It is certain, that *Sound* is not produced at the first, but with some *Locall Motion* of the *Aire*, or *Flame*; or some other *Medium*, Nor yet without some *Resistance*, either in the *Aire*, or the *Body Percussed*. For if there be a meer Yeelding or Cession, it perduceth no *Sound*; As hath beene said. And therein *Sounds* differ from *Light*, and *Colours*; which passe through the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the first, or after. But you must attentively distinguish, between the *Locall Motion* of the *Aire*, (which is but *Vehiculum causæ*, *a Carrier of the Sounds*,) and the *Sounds* themselves, Conveighed in the *Aire*. For as to the former, we see manifestly, that no *Sound* is produced (no not by *Aire* it selfe against other *Aire*, as in *Organs*, &c.) but with a perceptible *Blast* of the *Aire*; and with some Resistance of the *Aire* strucken. For even all *Speech*, (which is one of the gentlest *Motions* of *Aire*,) is with *Expulsion* of a little *Breath*. And all *Pipes* have a Blast, as well as a *Sound*. We see also manifestly, that *Sounds* are carried with Wind: And therefore *Sounds* will be heard further with the *Wind*, than against the *Wind*: and likewise doe rise and fall with the Intension or Remission of the *Wind*. But for the *Impression* of the *Sound*, it is quite another Thing; And is utterly without any *Locall Motion* of the *Aire*, Perceptible; And in that resembleth the *Species Visible*: for after a *Man* hath lured, or a *Bell* is rung, we cannot discern any *Perceptible Motion* (at all) in the *Aire*, along as the *sound* goeth; but onely at the first. Neither doth the *Wind* (as farre as it carrieth a *Voice*,) with the Motion thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in variety of Words. And if a *Man* speake a good loudnesse, against the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the mouth, as *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *Speaking*, will move the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the Sight, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation* of *Things visible*; which (without all question) induce no *Locall Motion* in the *Aire*, as hath been said. 125.

Nevertheless it is true, that upon the *Noise* of *Thunder*, and great *Ordnance*; Glasse windowes will shake; and Fishes are thought to be frayed 126.

with

with the Motion, cauſed by *Noiſe* upon the water. But theſe Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound*, (as hath been ſaid;) and not from the *Sound*.

127. It hath been anciently reported, and is ſtill received, that *Extreme applauſes*, and *ſhouting of people* aſſembled in great Multitudes, have ſo rarified, and broken the Aire, that Birds flying over, have fallen down, the Aire being not able to ſupport them. And it is beleeved by ſome, that *great Ringing of Bells* in populous Cities, hath chaſed away *Thunder*: and alſo diſſipated Peſtilent Aire: All which may be alſo from the Concuſſion of the Aire, and not from the *Sound*.

128. A very great *Sound*, near hand, hath ſtrucken many Deafe; And at the Inſtant they have found, as it were, the breaking of a Skin or Parchment in their Eare: And my ſelfe ſtanding near one that *Lured* loud, and ſhrill, had ſuddenly an Offence, as if ſomewhat had broken, or been diſlocated in my Eare; And immediately after a *loud Ringing*; (Not an ordinary Singing, or Hiſſing, but farre louder, and differing:) ſo as I feared ſome *Deafneſſe*. But after ſome halfe Quarter of an Houre it vaniſhed. This Effect may be truely referred unto the *Sound*: for (as is commonly received) an *overpotent Object* doth deſtroy the *Senſe*; And *ſpirituall Species*, (both *Viſible* and *Audible*,) will work upon the Senſories, though they move not any other Body.

129. In *Delation of Sounds*, the Encloſure of them preſerveth them, and cauſeth them to be heard further. And we find in rowles of Parchment, or Truncks, the Mouth being laid to the one end of the rowle of Parchment, or Trunck, and the *Eare* to the other, the *Sound* is heard much further, then in the *Open Aire*. The *Cauſe* is, for that the *Sound* ſpendeth, and is diſſipated in the *Open Aire*; but in ſuch Concaves it is conſerved, and contracted. So alſo in a Peece of Ordnance, if you ſpeak in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* paſſeth, and is farre better heard, than in the *Open Aire*.

130. It is further to be conſidered, how it proveth and worketh, when the *Sound* is not encloſed all the Length of his way, but paſſeth partly through open Aire; as where you *ſpeake* ſome diſtance from a *Trunck*; or where the *Eare* is ſome diſtance from the *Trunck*, at the other End; or where both *Mouth* and *Eare* are diſtant from the *Trunck*. And it is tryed, that in a long *Trunck*, of ſome eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Trunck*; And ſomewhat more holpen, when the *Eear* of the *Hearer* is near, than when the *Mouth* of the *Speaker*. And it is certain, that the *Voice* is better heard in a *Chamber* from *Abroad*, than *Abroad* from within the *Chamber*.

131. As the *Encloſure*, that is *Round about* and *Entire*, preſerveth the *Sound*; ſo doth a *Semi-concave*, though in a leſſe degree. And therefore, if you divide a *Trunck*, or a *Cane* into two, and one ſpeak at the one end, and you lay your Eare at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-concave*; but if you doe the like upon the *Maſt* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one ſpeak upon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, then in the Aire at large.

132. It would be tryed, how, and with what proportion of diſadvantage, the *Voice* will be carried in an *Horne*, which is a line Arched; Or in a *Trumpet*, which is a line Retorted; Or in ſome *Pipe* that were Sinuous.

It

133 It is certaine, (howſoever it croſſe the Received Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the moſt favourable *Deferent* of *Sounds*. Take a *Veſſell* of *Water*, and knap a paire of Tongs ſome depth within the Water, and you ſhall heare the *Sound* of the Tongs well, and not much diminiſhed; And yet there is no *Aire* at all preſent.

134 Take one *Veſſell* of *Silver*, and another of *Wood*, and fill each of them full of Water, and then knap the Tongs together, as before, about an handfull from the Bottome, and you ſhall find the *Sound* much more Reſounding from the *Veſſell* of *Silver*, than from that of *Wood*: And yet if there be no water in the *Veſſell*, ſo that you knap the Tongs in the *Aire*, you ſhall find no difference, between the *Silver* and the *Wooden Veſſell*. Whereby, beſide the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Veſſell*: The other, that ſuch a Communication paſſeth far better, thorow *Water* than *Aire*.

135 Strike any *Hard Bodies* together, in the midſt of a *Flame*, and you ſhall heare the *Sound* with little difference, from the *Sound* in the *Aire*.

136 The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath ſome Affinity with the *Aire*; performeth, in ſome degree, the Parts of the *Aire*; As when you knock upon an *Empty Barrell*, the *Sound* is (in part) created by the *Aire* on the Out-ſide; And (in part) by the *Aire* in the Inſide; For the *Sound* will be greater or leſſer, as the Barrell is more Empty, or more Full; But yet the *Sound* participateth alſo with the *Spirit* in the *Wood*, thorow which it paſſeth from the Out-ſide to the Inſide: And ſo it commeth to paſſe in the *Chiming* of *Bels*, on the Outſide; where alſo the *Sound* paſſeth to the Inſide: And a number of other like Inſtances, whereof we ſhall ſpeak more when we handle the *Communication* of *Sounds*.

137 It were extreame Groſſeneſſe to think, (as we have partly touched before, that the *Sound* in *Strings* is made, or produced, between the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For thoſe are but *Vehicula motus*, *Paſſages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulſion* of the *Aire* from the firſt *motion* of the *String*; but by the *Return* or *Reſult* of the *String*, which was ſtrained by the Touch, to his former Place: which *Motion* of *Reſult* is quick and ſharpe; Whereas the firſt Motion is ſoft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*.

Experiments in Conſort touching the *Magnitude*, and *Exility*, and *Damps* of *Sounds*.

138 TAke a *Trunck*, and let one whiſtle at the one End, and hold your Eare at the other, and you ſhall finde the *Sound* ſtrike ſo ſharpe, as you can ſcarce endure it. The *Cauſe* is, for that *Sound* diffuſeth it ſelfe in round, And ſo ſpendeth it Selfe; But if the *Sound*, which would ſcatter in *Open Aire*, be made to go all into a Canale; It muſt needs give greater force to the *Sound*. And ſo you may note, that *Encloſures* doe not only preſerve *Sound*, but alſo encreaſe and ſharpen it.

139 A *Hunters Horne*, being greater at one end, than at the other, doth encreaſe the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cauſe* is, for that the *Aire* and *Sound*, being firſt contracted at the leſſer End, and afterwards having more Roome to ſpread at the greater End, do dilate themſelves; And in comming out ſtrike more *Aire*; whereby the *Sound* is the Greater, and Baſer. And even *Hunters Hornes*, which are ſometimes made ſtraight, and not Oblique, are ever greater at the lower end. It would

be tried alſo in *Pipes*, being made *far larger* at the lower End: Or being made with a *Belly* towards the lower End; And then iſſuing into a ſtraight Concave again.

140 There is in *Saint James's Fields*, a *Conduit* of *Brick*, unto which joyneth a *low Vault*; And at the End of that, a *Round Houſe* of Stone: And in the *Brick Conduit* there is a Window; And in the *Round Houſe*, a Slit or Rift of ſome little breadth: if you cry out in the Rift, it will make a fearefull roaring at the Window. The *Cauſe* is the ſame with the former; For that all *Concaves*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out.

141 *Hawkes Bels*, that have Holes in the Sides, give a greater Ring, than if the Pellet did ſtrike upon Braſſe, in the *Open Aire*. The Cauſe is the ſame with the firſt *Inſtance* of the *Trunck*; Namely, for that the *Sound* Encloſed with the Sides of the *Bell*, commeth forth at the *Holes* unſpent, and more ſtrong.

142 In *Drums*, the Cloſeneſſe round about, that preſerveth the *Sound* from diſperſing, maketh the *Noiſe* come forth at the *Drum-Hole*, far more loud, and ſtrong, than if you ſhould ſtrike upon the like *Skin*, extended in the Open Aire. The *Cauſe* is the ſame with the two precedent.

143 *Sounds* are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noone*, or in thr *Day*. The *Cauſe* is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thick (as in the *Night*) the *Sound* ſpendeth and ſpreadeth abroad leſſe: And ſo it is a Degree of *Encloſure*. As for the *Night*, it is true alſo, that the Generall Silence helpeth.

144 There be two kinds of *Reflexions* of *Sounds*; the one at *Diſtance*, which is the *Eccho*; Wherein the *Originall* is heard diſtinctly, and the *Reflexion* alſo diſtinctly; Of which we ſhall ſpeak hereafter: The other in *Concurrence*, When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly upon the *Originall*, and ſo iterateth it not, but amplifieth it. Therefore we ſee, that *Muſick* upon the Water ſoundeth more; And ſo likewiſe *Muſick* is better in Chambers Wainſcotted, than Hanged.

145 The *Strings* of a Lute, or Violl, or Virginals, doe give a farre greater *Sound*, by reaſon of the *Knot* and *Board*, and *Concave* underneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Upper Aire into the Lower. The *Cauſe* is, the Communication of the Upper Aire with the Lower; And penning of both from Expence, or Diſperſing.

146 An *Iriſh Harpe* hath Open Aire on both ſides of the *Strings*: And it hath the *Concave* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more Reſounding *Sound*, than a *Bandora*, *Orpharion*, or *Cittern*, which have likewiſe *Wire-ſtrings*. I judge the *Cauſe* to be, for that Open Aire on both Sides helpeth, ſo that there be a *Concave*; Which is therefore beſt placed at the End.

147 In a *Virginall*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cauſe* is, for that all *Shutting in* of *Aire*, where there is no competent Vent, dampeth the *Sound*: Which maintaineth likewiſe the former *Inſtance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* ſomewhat.

148 There is a *Church* at *Gloceſter*, (and as I have heard the like is in ſome other places;) where if you ſpeak againſt a Wall, ſoftly, another ſhall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the Fame of that place. I ſuppoſe there is ſome Vault, or Hollow,

Hollow, or Isle, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speak; So as the *Voice* of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the *Aire* of the Hollow; For it is preserved somewhat by the plaine Wall; but that is too weake to give a *Sound* Audible, till it hath communicated with the back *Aire*.

Strike upon a *Bow-string*, and lay the *Horne* of the *Bow* neare your Eare, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the Sensory, by reason of the Close Holding, is percussed, before the Aire disperseth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse betweene those two Parts; As appeareth by this; That a harsh *grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Eare. 149

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike upon the other, it maketh a far greater *Sound*, than the like Stroke upon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that have beene partly touched, it should appeare; That *Sounds* do not only slide upon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body. 150

I remember in *Trinity Colledge* in *Cambridge*, there was an *Upper Chamber*, which being thought weak in the Roof of it, was supported by a Pillar of Iron, of the bignesse of ones Arme, in the middest of the *Chamber*; which if you had struck, it would make a little flat Noise in the *Room* where it was struck; But it would make a great Bombe in the *Chamber* beneath. 151

The *Sound* which is made by *Buckets* in a *Well*, when they touch upon the *Water*; Or when they strike upon the side of the *Well*; Or when two Buckets dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Aire*. The *Cause* is the Penning and Enclosure of the *Aire*, in the Concave of the *Well*. 152

Barrels placed in a Roome under the Floare of a *Chamber*, make all *Noises* in the same Chamber, more full and Resounding. 153

So that there be five wayes (in generall,) of Majoration of Sounds: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; *and* Approach *to the* Sensory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solid* and *Hard Bodies*, if they bee not too thick. And thorow *Water*; which is likewise a very Close Body; and such an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weaknesse*, or *Exility*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Ætites* or *Eagles* Stone, which hath a little Stone within it. 154

And as for *Water*, it is a certaine Triall: Let a man goe into a *Bath*, and take a *Paile*, and turne the Bottome upward, and carry the Mouth of it (Even,) downe to the Levell of the *Water*, and so presse it downe under the *Water*, some handfull and an halfe, still keeping it even, that it may not tilt on either side, and so the Aire get onto Then let him that is in the *Bath*, dive with his Head so far under *Water*, as he may put his Head into the *Paile*, and there will come as much *Aire* bubling forth, as will make Roome for his Head. Then let him speak, and any that shall stand without, shall heare his *Voice* plainly; but yet made extreame sharp and exile, like the *Voice* of 155

Puppets: But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handſomely done, if the *Paile* be put over the Mans head above Water, and then he cowre downe, and the *Paile* be preſſed downe with him. Note that a Man muſt kneele or ſit, that he may be lower than the *Water*. A man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he ſaith, That *Hercules*'s *Page Hylas* went with a Water-pot, to fill it at a pleaſant *Fountaine*, that was near the Shore, and that the *Nymphs* of the *Fountaine* fell in love with the Boy, and pulled him under *Water*, keeping him alive; And that *Hercules* miſſing his *Page*, called him by his Name aloud, that all the Shore rang of it; And that *Hylas* from within the Water, anſwered his Maſter; But (that which is to the preſent purpoſe) with ſo ſmall and exile a *Voice*, as *Hercules* thought he had been three Miles off, when the *Fountaine* (indeed) was faſt by.

156 In *Lutes*, and *Inſtruments* of *Strings*, if you ſtop a *String* high, (whereby it hath leſſe Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and ſtrike the Edge of the one againſt the Bottome of the other, within a *Paile* of *Water*; And you ſhall find, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; even while Part of the *Sawcer* is above the Water; But that Flatneſſe of *Sound* is joyned with a harſhneſſe of *Sound*; which (no doubt is cauſed by the inequality of the *Sound*, which commeth from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becommeth more cleare, but far more low; And as if the *Sound* came from a far off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*: As if a Bell hath Cloth or Silk wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericalls*, the Keyes are lined; And in Colledges they uſe to line the Tablemen.

159 Triall was made in a *Recorder*, after theſe ſeverall manners. The Bottome of it was ſet againſt the Palme of the Hand; ſtopped with Wax round about, ſet againſt a Damask Cuſhion; Thruſt into Sand; into Aſhes; into Water, (halfe an Inch under the Water;) Cloſe to the Bottome of a Silver Baſin; And ſtill the *Tone* remained: But the Bottome of it was ſet againſt a Woollen Carpet; A Lining of Pluſh; A Lock of Wooll, (though looſely put in;) Againſt Snow; And the ſound of it was quite deaded, and but Breath.

160 *Iron* Hot produceth not ſo full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more Soft, and leſſe Reſounding. So likewiſe *Warme Water*, when it falleth, maketh not ſo full a *Sound*, as *Cold*: And I conceive it is ſofter, and nearer the Nature of Oile; For it is more ſlippery; As may be perceived, in that it ſcowreth better.

161 Let there be a *Recorder* made, with two Fipples, at each end one; The *Trunck* of it of the length of two *Recorders*, and the Holes anſwerable towards each end; And let two play the ſame Leſſon upon it, at an Uniſon; And let it be noted whether the *Sound* be confounded; or amplified; or dulled. So likewiſe let a *Croſſe* be made, of two Truncks (thorowout) hollow; And let two ſpeak, or ſing, the one long wayes, the other traverſe: And let two heare at the oppoſite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Inſtances* will alſo give light to the *Mixture* of *Sounds*, whereof we ſhall ſpeak hereafter.

162 A *Bellowes* blowne into the *Hole* of a *Drum*, and the *Drum* then ſtrucken, maketh

maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cauſe* is manifeſt; Partly for that it hindereth the Iſſue of the *Sound*; And partly for that it maketh the Aire, being blown together, leſſe moveable.

THe *Loudneſſe* and *Softneſſe* of *Sound*, is a Thing diſtinct from the *Magnitude* and *Exility* of *Sound*; For a *Baſe String*, though ſoftly ſtrucken, giveth the greater *Sound*; But a *Treble String*, if hard ſtrucken, will be heard much further off. And the *Cauſe* is, for that the *Baſe String* ſtriketh more Aire; and the *Treble* leſſe Aire, but with a ſharper Percuſſion.

Experiments in Conſort, touching the *Loudneſſe*, or *Softneſſe* of *Sounds*; and their *Carriage at longer or ſhorter Diſtance.*

It is therefore the *Strength* of the *Percuſſion*, that is a Principall *Cauſe* of the *Loudneſſe* or *Softneſſe* of *Sounds*: As in knocking harder or ſofter; Winding of a Horne ſtronger or weaker; Ringing of a Hand-bell harder or ſofter, &c. And the *Strength* of this *Percuſſion*, conſiſteth, as much, or more, in the *Hardneſſe* of the *Body Percuſſed*, as in the *Force* of the *Body Percuſſing*: For if you ſtrike againſt a Cloth, it will give a leſſe *Sound*; If againſt Wood, a greater; If againſt Metall, yet a greater; And in Metals, if you ſtrike againſt Gold, (which is the more pliant,) it giveth the flatter *Sound*; If againſt Silver, or Braſſe, the more Ringing *Sound*. As for *Aire*, where it is ſtrongly pent, it matcheth a *Hard Body*. And therefore we ſee in diſcharging of a *Peece*, what a great Noiſe it maketh. We ſee alſo, that the Charge with Bullet; Or with Paper wet, and hard ſtopped; Or with Pouder alone, rammed in hard; maketh no great difference in the *Loudneſſe* of the Report. 163 164

The *Sharpneſſe* or *Quickneſſe* of the *Percuſſion*, is a great *Cauſe* of the *Loudneſſe*, as well as the *Strength*: As in a Whip or Wand, if you ſtrike the Aire with it; the Sharper and Quicker you ſtrike it, the *Louder Sound* it giveth. And in playing upon the *Lute*, or *Virginalls*, the quick Stroke or Touch, is a great life to the *Sound*. The *Cauſe* is, for that the Quick Striking cutteth the Aire ſpeedily; whereas the Soft Striking doth rather beat, than cut. 165

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Empty Veſſels, &c.) hath been touched obiter, in the *Majoration* of *Sounds*: But it is fit alſo to make a *Title* of it apart.

Experiments in Conſort touching the *Communication* of *Sounds*.

The *Experiment* for greateſt Demonſtration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you ſtrike with a Hammer upon the Upper Part, and then upon the Midſt, and then upon the Lower, you ſhall find the *Sound* to be more Treble, and more Baſe, according unto the Concave, on the Inſide: though the Percuſſion be onely on the Outſide. 166

When the *Sound* is created between the *Blaſt* of the *Mouth*, and the *Aire* of the *Pipe*, it hath nevertheleſſe ſome *Communication* with the Matter of the Sides of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of Wood, and Braſſe, the *Sound* will be divers; So if the *Pipe* be covered with *Cloth*, or *Silke*, it will give a divers *Sound*, from that it would doe of it ſelfe; So, if the *Pipe* be a *little wet* on the *Inſide*, it will make a differing *Sound*, from the ſame *Pipe dry*. 167

That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Aire*, it doth with *Aire*; *Vide Experimentum*, 134. 168

Experiments in Conſort touching *Equality*, and *Inequality* of *Sounds*.

Wee have ſpoken before (in the *Inquiſition* touching *Muſicke*,) of *Muſicall Sounds*, whereunto there may be a Concord or

Diſcord in two Parts; Which *Sounds* we call *Tones*: And likewiſe of *Immuſicall Sounds*; And have given the *Cauſe*, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And we have alſo expreſſed there, what are the *Equall Bodies* that give *Tones*, and what are the *Unequall* that give none. But now we ſhall ſpeake of ſuch *Inequalitie* of *Sounds*, as proceedeth, not from the Nature of the Bodies themſelves, but is Accidentall; Either from the *Roughneſſe*, or *Obliquity* of the *Paſſage*; or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it have a *Riſt* in it, whereby the *Sound* hath not a cleare Paſſage, giveth a *Hoarſe* and *Jarring Sound*; So the *Voice* of *Man*, when by Cold taken the Weſill groweth rugged, and (as we call it) furred, becommeth hoarſe. And in theſe two *Inſtances* the *Sounds* are Ingrate; becauſe they are meerely *Vnequall*: But, if they be *Vnequall* in *Equality*, then the *Sound* is Gratefull, but Purling.

170 All *Inſtruments*, that have either *Returnes*, as Trumpets; Or *Flexions*, as Cornets; Or are *Drawne up*, and *put from*, as Sackbuts, have a *Purling Sound*: But the *Recorder*, or *Flute*, that have none of theſe *Inequalities*, give a cleare *Sound*. Nevertheleſſe, the *Recorder* it ſelfe, or *Pipe* moiſtened a little in the Inſide, ſoundeth more ſolemnly, and with a little Purling, or Hiſſing. Againe, a *Wreathed String*, ſuch as are in the Baſe Strings of *Bandorae*, giveth alſo a *Purling Sound*.

171 But a *Lute-ſtring*, if it be meerely *Vnequall* in his Parts, giveth a Harſh and Untuneable *Sound*; which *Strings* we call *Falſe*, being bigger in one Place then in another; And therefore *Wire-ſtrings* are never *Falſe*. We ſee alſo, that when we try a *Falſe Lute-ſtring*, we uſe to extend it hard between the Fingers, and to fillip it; And if it giveth a double *Species*, it is *True*; But if it giveth a treble, or more, it is *Falſe*.

172 *Waters*, in the *Noiſe* they make as they runne, repreſent to the Eare a *Trembling Noiſe*; And in *Regals*, (where they have a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling: And Children have alſo little Things they call *Cockes*, whith have *Water* in them; And when they blow, or whiſtle in them, they yeeld a *Trembling Noiſe*; Which *Trembling* of *Water*, hath an affinity with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleaſant, than otherwiſe.

173 All *Baſe Notes*, or very *Treble Notes*, give an Aſper *Sound*; For that the *Baſe* ſtriketh more Aire, than it can well ſtrike equally: And the *Treble* cutteth the Aire ſo ſharpe, as it returneth too ſwift, to make the *Sound* Equall: And therefore a *Meane*, or *Tenor*, is the ſweeteſt Part.

174 We know Nothing, that can at pleaſure make a *Muſicall*, or *Immuſicall Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The *Cauſe* is, (no doubt) in the Weaſill or Wind Pipe, (which we call *Aſpera Arteria*,) which being well extended, gathereth *Equality*; As a Bladder that is wrinckled, if it be extended, becommeth ſmooth. The Extenſion is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whiſper* can never give a *Tone*: And in *Singing*, there is (manifeſtly) a greater Working and Labour of the Throat, than in *Speaking*; as appeareth

in

in the Thrusting out, or Drawing in of the Chinne, when we sing.

175 The *Humming* of *Bees*, is an *Unequall Buzzing*; and is conceived by some of the Ancients, not to come forth at their Mouth, but to be an *Animal Sound*: but (it may be) it is neither; but from the motion of their Wings; For it is not heard but when they stirre.

176 All *Metalls quenched* in *Water*, give a Sibilation or Hissing sound, (which hath an Affinity with the letter *Z*.) notwithstanding the *Sound* be created between the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small store of *Water*, in a Vessell, giveth a Hissing *Sound*; but *Boyling* in a full Vessell, giveth a Bubbling *Sound*, drawing somewhat neer to the Gutts used by Children.

177 Triall would be made, whether the *Inequality*, or Interchange of the *Medium*, will not produce an *Inequality* of *Sound*; as if three *Bells* were made one within another, and Aire betwixt each; and then the outermost *Bell* were chimed with a Hammer, how the *Sound* would differ from a Simple *Bell*. So likewise take a *Plate* of *Brasse*, and a *Plancke* of *Wood*, and joyne them close together, and knock upon one of them, and see if they doe not give an *Inequall Sound*. So make two or three *Partitions* of *Wood* in a *Hogshead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *Partitions*.

Experiments in Consort touching the *more Treble*, and the *more Base Tones*, or *Musicall Sounds*.

IT is evident, that the *Percussion* of the *Greater Quantity of Aire*, causeth the *Baser Sound*; And the lesse *Quantity*, the more *Treble sound*. The *Percussion* of the *Greater Quantity of Aire*, is produced by the *Greatnesse of the Body Percussing*; by the *Latitude* of the *Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater bore then a *Treble*. And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Base Sound* they yeeld; and the neerer the Mouth, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the Top, it maketh a more *Treble Sound*; and at the Bottome a *Baser*. 178.

179. It is also evident, that the *Sharper* or *Quicker percussion of Aire* causeth the more *Treble Sound*, and the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*, the more they are wound up, and strained, (And thereby give a more quick Start back;) the more *Treble* is the *Sound*. And the slacker they are, or lesse wound up, the *Baser* is the *Sound*. And therefore a bigger *String* more strained, and a lesser *String*, lesse strained, may fall into the same *Tone*.

180 *Children*, *Women*, *Eunuchs* have more small and shrill *Voices*, than *Men*. The Reason is, not for that *Men* have greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) but from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voice*, at the yeares of Puberty, is more obscure. It seemeth to be, for that when much of the Moysture of the Body, which did before irrigate the Parts, is drawne down to the Spermaticall vessels; it leaveth the Body more hot then it was; whence commeth the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilosity, more Roughnesse of the Skinne, Hardnesse of the Flesh, &c.

181 The Industry of the *Musitian*, hath produced two other Meanes of *straining*, or *Intension* of *Strings*, besides their *Winding up*. The one is the *Stopping* of

of the *String* with the *Finger*; As in the Necks of Lutes, Viols, &c. The other is the *Shortneſſe* of the *String*; As in Harps, Virginalls, &c. Both theſe have one, and the ſame reaſon; For they cauſe the *String* to give a quicker Start.

182 In the *Straining* of a *String*, the further it is ſtrained, the leſſe *Superſtraining* goeth to a *Note*; For it requiteth good Winding of a String, before it will make any Note at all: And in the Stops of Lutes, &c. the higher they goe, the leſſe Diſtance is between the Frets.

183 If you fill a *Drinking Glaſſe* with *Water*, (eſpecially one Sharp below, and Wide above,) and Fillip upon the Brim, or Out-ſide; And after empty Part of the *Water*, and ſo more and more, and ſtill try the *Tone* by Fillipping; you ſhall find the *Tone* fall, and be more *Baſe*, as the *Glaſſe* is more Empty.

Experiments in Conſort touching the *Proportion* of *Treble* and *Baſe Tones*.

The Juſt and Meaſured *Proportion* of the *Aire Percuſſed*, towards the *Baſeneſſe* or *Trebleneſſe* of *Tones*, is one of the greateſt Secrets in the Contemplation of *Sounds*. For it diſcovereth the true *Coincidence* of *Tones* into *Diapaſons*; Which is the Returne of the ſame *Sound*. And ſo of the *Concords* and *Diſcords*, betweene the *Uniſon*, and *Diapaſon*; Which we have touched before, in the *Experiments* of *Muſick*; but think fit to reſume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may be found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Diſtance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But moſt commodiouſly in the laſt of theſe.

184 Try therefore the *Winding* of a *String* once about, as ſoon as it is brought to that Extenſion, as will give a *Tone*; And then of twice about; And thrice about, &c. And marke the Scale or Difference of the Riſe of the *Tone*: Whereby you ſhall diſcover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimenſion* of the *Winding*; And the *Proportion* likewiſe of the *Sound* towards the *String*, as it is more or leſſe ſtrained. But note that to meaſure this, the way will be, to take the Length in a right Line of the *String*, upon any Winding about of the Pegge.

185 As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the firſt Stop of the *String*, unto ſuch a Stop as ſhall produce a *Diapaſon* to the former Stop, upon the ſame *String*.

186 But it will beſt (as it is ſaid) appeare, in the *Bores* of *Wind-Inſtruments*: And therefore cauſe ſome halfe dozen *Pipes*, to be made, in length, and all things elſe, alike, with a ſingle, double, and ſo on to a ſextuple *Bore*; And ſo marke what Fall of *Tone* every one giveth. But ſtill in theſe three laſt *Inſtances*, you muſt diligently obſerve, what *Length* of *String*, or *Diſtance* of *Stop*, or *Concave* of *Aire*, maketh what *Riſe* of *Sound*. As in the laſt of theſe (which (as we ſaid) is that, which giveth the apteſt demonſtration,) you muſt ſet downe what Encreaſe of *Concave* goeth to the making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And ſo up to the *Diapaſon*: For then the great Secret of *Numbers* and *Proportions*, will appeare. It is not unlikely, that thoſe that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewiſe *Bell-founders* in fitting the

the tune of their *Bells*. So that Enquiry may ſave Triall, Surely, it hath been obſerved by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapaſon* to the *Sound* of the like *Barrell-full*; But how that ſhould be, I doe not well underſtand; For that the knocking of a *Barrell*, *Full* or *Empty*, doth ſcarce give any *Tone*.

187 There is required ſome ſenſible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it ſelfe, which is the Paſſive: And that it be not too neare, but at a diſtance. For in a *Recorder*, the three uppermoſt Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the firſt three. And the like (no doubt) is required in the Winding or Stopping of *Strings*.

Experiments in Conſort touching *Exteriour*, and *Interiour Sounds*.

There is another Difference of *Sounds*, which we will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Baſe*, nor *Treble*: Nor it is not *Muſicall*, nor *Immuſicall*: Though it bee true, that there can be no *Tone* in an *Interiour Sound*: But on the other ſide, in an *Exteriour Sound*, there may be both *Muſicall* and *Immuſicall*. We ſhall therefore enumerate them, rather than preciſely diſtinguiſh them; Though (to make ſome Adumbration of that we mean) the *Interiour* is rather an *Impulſion* or *Contaſion* of the *Aire*, than an *Eliſion* or *Section* of the ſame. So as the *Percuſſion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

188 In *Speech* of *Man*, the *Whiſpering*, (which they call *Suſurrus* in *Latine*,) whether it be louder or ſofter, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can never make a *Tone*, nor ſing in *Whiſpering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *Wind*, (though lowd) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concave*, (though ſoft) is an *Exteriour*. So likewiſe the greateſt *Winds*, if they have no Coarctation, or blow not hollow, give an *Interiour Sound*; The Whiſtling or hollow *Wind* yeeldeth a Singing, or *Exteriour Sound*; The former being pent by ſome other Body; The later being pent in by his own Denſity: And therefore we ſee, that when the *Wind* bloweth hollow, it is a Signe of Raine. The *Flame*, as it moveth within it ſelfe, or is blown by a *Bellowes*, giveth a Murmur or *Interiour Sound*.

189 There is no *Hard Body*, but ſtruck againſt another *Hard Body*, will yeeld an *Exteriour Sound*, greater or leſſer: In ſo much as if the Percuſſion be over-ſoft, it may induce a Nullity of *Sound*; But never an *Interiour Sound*; As when one treaderh ſo ſoftly, that he is not heard.

190 Where the *Aire* is the *Percutient*, pent, or not pent, againſt a *Hard Body*, it never giveth an *Exteriour Sound*; As if you blow ſtrongly with a Bellowes againſt a Wall.

191 *Sounds* (both *Exteriour* and *Interiour*,) may be made, as well by *Suction*, as by *Emiſſion* of the *Breath*: As in *Whiſtling*, or *Breathing*.

It

Experiments in Consort touching *Articulation of Sounds.*

191 IT is evident, and it is one of the ſtrangeſt Secrets in *Sounds*: that the *whole Sound* is not in the *whole Aire* onely; But the *whole Sound* is alſo in every ſmall *Part* of the *Aire*. So that all the curious Diverſitie of *Articulate Sounds* of the Voice of Man, or Birds, will enter at a ſmall Cranny, Inconfuſed.

193 The *Vnequall Agitation* of the *Winds*, and the like, though they be materiall to the Carriage of the *Sounds*, further or leſſe way; yet they doe not confound the *Articulation* of them at all, within that diſtance that they can be heard; Though it may be, they make them to be heard leſſe Way, than in a Still; as hath been partly touched.

194 Over-great Diſtance confoundeth the *Articulation* of *Sounds*; As we ſee, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot diſtinguiſh what he ſaith. And one *Articulate Sound* will confound another; as when many ſpeake at once.

195 In the *Experiment* of *Speaking under Water*, when the Voice is reduced to ſuch an Extreme Exility, yet the *Articulate Sounds*, (which are the *Words*) are not confounded; as hath been ſaid.

196 I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Diſperſing*: And although (as was formerly ſaid) a *Sound Articulate*, already created, will be contracted into a ſmall Cranny; yet the firſt *Articulation* requireth more Dimenſion.

197 It hath been obſerved, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewiſe in the Roofe, a Preacher cannot be heard ſo well, as in the like Places not ſo Vaulted. The Cauſe is, for that the *Subſequent Words* come on, before the *Precedent Words* vaniſh: And therefore the *Articulate Sounds* are more confuſed, though the Groſſe of the *Sound* be greater.

198 The *Motions* of the *Tongue*, *Lips*, *Throat*, *Palat*, &c. which go to the *Making* of the ſeverall *Alphabeticall Letters*, are worthy Enquiry, and pertinent to the preſent *Inquiſition* of *Sounds*: But becauſe they are ſubtill, and long to deſcribe, we will referre them over, and place them amongſt the *Experiments* of *Speech*. The *Hebrewes* have been diligent in it, and have aſſigned, which *Letters* are *Labiall*, which *Dentall*, which *Guttural*, &c. As for the *Latines*, and *Grecians*, they have diſtinguiſhed between *Semi-vowels*, and *Mutes*; And in *Mutes*, between *Mutæ Tenues*, *Mediæ*, and *Aſpiratæ*; Not amiſſe; But yet not diligently enough. For the ſpeciall *Strokes*, and *Motions*, that create thoſe *Sounds*, they have little enquired: As that the *Letters*, *B. P. F. M.* are not expreſſed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters*, *N.* and *B.* cannot be pronounced, but that the *Letter*, *N.* will turne into *M.* As *Hecatomba*, will bee *Hecatomba*. That *M.* and *T.* cannot bee pronounced together; but *P.* will come between; as *Emtus*, is pronounced *Emptus*; And a number of the like. So that if you enquire to the full; you will finde, that to the Making of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

199 The *Lungs* are the moſt Spongy Part of the Body; And therefore ableſt to contract, and dilate it ſelfe; And where it contracteth it ſelfe, it expelleth the *Aire*; which thorow the *Artire*, *Throate*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the

the help of the *Tongue*, *Palat*, and the reſt of thoſe they call *Inſtruments* of *voyce*.

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that have no *Voyce Articulate*; and divers *Letters* of *Articulate Voyces*: And commonly Men have given ſuch Names to thoſe *Sounds*, as doe allude unto the Articulate Letters. As *Trembling* of *Water* hath Reſemblance with the *Letter L*: *Quenching* of *Hot Metalls*, with the *Letter Z*: *Snarling* of *Dogs*, with the *Letter R*: The *Noiſe* of *Scritch-Owles*, with the *Letter Sh*: *Voyce* of *Cats*, with the *Dipthong Eu*: *Voyce* of *Cuckoes*, with the *Dipthong Ou*: *Sounds* of *Strings*, with the *Letter Ng*: So that if a Man, (for Curioſity, or Strangeneſſe ſake,) would make a *Puppet* or other Dead Body, to pronounce a *Word*; Let him conſider, on the one Part, the Motion of the *Inſtruments* of *Voyce*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that cauſeth the Similitude of *Sounds*; And by that he may miniſter light to that Effect. 200

NA-

NATVRALL HISTORIE.

III. Century.

ALL *Sounds* (whatſoever) move Round; That is to ſay; On all *Sides*; *Vpwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Inſtances*. 201

Sounds do not require to be conveyed to the *Senſe*, in a *Right Line*, as *Viſibles* doe, but may be *Arched*; Though it be true, they move ſtrongeſt in a *Right Line*; Which nevertheleſſe is not cauſed by the *Rightneſſe* of the *Line*, but by the Shortneſs of the diſtance; *Linea recta breviſſima*. And therefore we ſee, if a *Wall* be between, and you ſpeak on the one Side, you heare it on the other; Which is not becauſe the *Sound* Paſſeth thorow the *Wall*; but *Archeth* over the *Wall*. Experiments in Conſort touching the *Motions* of *Sounds*, in what *Lines* they are *Circular*, *Oblique*, *Straight*; *Upwards*, *Downwards*; *Forwards*, *Backwards*.

202

If the *Sound* be *Stopped* and *Repercuſſed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one ſide of the Boot be downe, and the other up; And a Begger beg on the Cloſe Side; you would think that he were on the Open Side. So likewiſe, if a *Bell* or *Clock*, be (for Example) on the North ſide of a Chamber; And the Window of that Chamber be upon the South; He that is in the Chamber will think the *Sound* came from the South. 203

Sounds, though they *ſpread round*, (ſo that there is an *Orbe*, or *Sphericall Area* of the *Sound*;) yet they move ſtrongeſt, and goe furtheſt in the *Fore-Lines*, from the firſt Locall Impulſion of the Aire. And therefore in *Preaching*, you ſhall heare the *Preachers* Voice, better, before the Pulpit, than behind it, or on the Sides, though it ſtand open. So a *Harquebuz*, or *Ordinance*, will be further heard, forwards, from the Mouth of the *Peece*, than backwards, or on the Sides. 204

It may be doubted, that *Sounds* doe move better Downwards, than Upwards. *Pulpits* are placed high above the people. And when the Ancient *Generalls* ſpake to their Armies, they had ever a Mount of Turfe caſt up, whereupon they ſtood: But this may be imputed to the Stops and Obſtacles, which the voice meeteth with, when one ſpeaketh upon the levell. But 205

there ſeemeth to be morein it: For it may be, that *Spirituall Species*, both of *Things Viſible* and *Sounds* doe move better *Downwards* than *Vpwards*. It is a ſtrange Thing that to Men ſtanding below on the Ground, thoſe that be on the Top of Pauls, ſeem much leſſe than they are, and cannot be known; But to Men above, thoſe below ſeem nothing ſo much leſſened, and may be knowne: yet it is true, that all things to them above, ſeem alſo ſomewhat contracted, and better collected into Figure: as *Knots* in *Gardens* ſhew beſt from an Upper window, or Tarras.

206 But to make an exact Triall of it, let a Man ſtand in a *Chamber*, not much above the Ground, and ſpeake out at the window, thorow a *Trunk*, to one ſtanding on the Ground, as ſoftly as he can, the other laying his Eare cloſe to the *Trunk*: Then *via verſa*, let the other ſpeake *below* keeping the ſame Proportion of Softneſſe; And let him in the *Chamber* lay his Eare to the *Trunk*. And this may be the apteſt Meanes, to make a Judgement, whether *Sounds* deſcend, or aſcend, better.

Experiments in Conſort, touching the *Laſting* and *Periſhing* of *Sounds*; And touching the *Time* they require to their *Generation*, or *Delation*.

AFter that *Sound* is created, (which is in a moment,) we find it continueth ſome ſmall time, melting by little and little. In this there is a wonderfull Errour amongſt Men, who take this to be a *Continuance* of the Firſt *Sound*: whereas (in truth) it is a *Renovation*, and not a *Continuance*: For the *Body percuſſed*, hath by reaſon of the *Percuſſion*, a *Trepidation* wrought in the *Minute Parts*; and ſo reneweth the *Percuſſion* of the *Aire*. This appeareth manifeſtly, becauſe that the Melting *Sound* of a Bell, or of a String ſtrucken, which is thought to be a *Continuance*, ceaſeth as ſoone as the Bell or String are touched. As in a Virginall, as ſoone as ever the Jack falleth, and toucheth the String, the Sound ceaſeth; And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaſeth. And in this you muſt diſtinguiſh that there are two *Trepidations*: The one Manifeſt, and Local; As of the Bell, when it is Penſile: The other Secret, of the Minute Parts; ſuch as is deſcribed in the ninth Inſtance. But it is true, that the *Local* helpeth the *Secret* greatly. We ſee likewiſe that in Pipes, and other winde Inſtruments, the *Sound* laſteth no longer, than the breath bloweth. It is true, that in Organs, there is a confuſed Murmur for a while, after you have plaied; But that is but while the Bellowes are in Falling.

208 It is certain, that in the *Noiſe* of great *Ordnance*, where many are ſhot off together, the *Sound* will be carried, (at the leaſt) twenty Miles upon the land, and much further upon the Water. But then it will come to the Eare, Not in the Inſtant of the Shooting off, but it will come an Houre, or more later. This muſt needs be a *Continuance* of the *Firſt Sound*; For there is no *Trepidation* which ſhould renew it. And the Touching of the *Ordnance* would not extinguiſh the *Sound* the ſooner: So that in great *Sounds* the *Continuance* is more then Momentany.

209 To try exactly the time wherein *Sound* is *Delated*, Let a Man ſtand in a Steeple, and have with him a Taper; And let ſome vaile be put before the Taper; And let another Man ſtand in the Field a Mile off. Then let him in the Steeple ſtrike the Bell; And in the ſame inſtant withdraw the Vaile; And ſo let him in the Field tell by his Pulſe what diſtance of *Time* there is between the *Light ſeene*, and the *Sound heard*: for it is certain that the *Delation* of Light is in an Inſtant. This may be tried in far greater Diſtances, allowing greater *Lights* and *Sounds*.

210 It is generally knowne and obſerved, that *Light*, and the *Object* of *Sight*, move ſwifter than *Sound*; For we ſee the *Flaſh* of a Peece is ſeene ſooner,

than

than the *Noiſe* is heard. And in Hewing Wood, if one be ſome diſtance off, he ſhall ſee the Arme lifted up for a ſecond Stroke, before he heare the *Noiſe* of the firſt. And the greater the Diſtance, the greater is the Prevention: As we ſee in Thunder, which is farre off; where the Lightning precedeth the Crack a good ſpace.

211 *Colours*, when they repreſent themſelves to the Eye, fade not, nor melt not by Degrees, but appeare ſtill in the ſame ſtrength; But *Sounds* melt, and vaniſh by little and little. The Cauſe is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plain Argument, that *Sound* participateth of ſome *Locall Motion*, of the *Aire*, (as a Cauſe *Sine quâ non*,) in that, it periſheth ſo ſuddenly; For in every Section, or Impulſion of the *Aire*, the *Aire* doth ſuddenly reſtore and reunite it ſelfe; which the *Water* alſo doth, but nothing ſo ſwiftly.

a Experiments in Conſort touching the *Paſſage* and *Interceptions* of *Sounds*.

In the Trials of the *Paſſage*, or *Not Paſſage* of *Sounds*, you muſt take heed, you miſtake not the *Paſſing by the ſides* of a Body, for the *Paſſing thorow* a Body: and therefore you muſt make the *Intercepting* Body very cloſe; For *Sound* will paſſe thorow a ſmall Chinck.

212 Where *Sound* paſſeth thorow a *Hard*, or *Cloſe Body* (as thorow *Water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bels ſtopped, &c.) the *Hard* or *Cloſe Body*, muſt be but thinne and ſmall; For elſe it deadeth and extinguiſheth the *Sound* utterly. And therefore, in the *Experiment* of *Speaking in Aire under Water*, the voice muſt not be very deep within the *Water*: For then the *Sound* pierceth not. So if you ſpeak on the further ſide of a *Cloſe Wall*, if the *Wall* be very thick, you ſhall not be heard: And if there were an Hogſhead empty, whereof the Sides were ſome two Foot thick, and the Bunghole ſtopped: I conceive the Reſounding Sound, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none: but only you ſhall heare the *Noiſe* of the Outward Knock, as if the Veſſell were full.

213 It is certaine, that in the *Paſſage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it ſelfe, doth cooperate; But much better, when the Sides of that *Hard Body* are ſtruck, than when the Percuſſion is only within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes ſtopped up, and hang it by a threed, within a Bottle Glaſſe; And ſtop the Mouth of the Glaſſe, very cloſe with Wax, and then ſhake the Glaſſe, and ſee whether the Bell give any *Sound* at all, or how weak: But note, that you muſt inſteed of the Threed, take a Wire; or elſe let the Glaſſe have a great Belly; leſt when you ſhake the Bell, it daſh upon the Sides of the Glaſſe.

214 It is plain, that a very *Long*, and *Down-right Arch*, for the *Sound* to paſſe, will extinguiſh the *Sound* quiet; So that that *Sound*, which would be heard over a Wall, will not be heard over a Church; Nor that *Sound*, which will be heard, if you ſtand ſome diſtance from the wall, will be heard if you ſtand cloſe under the Wall.

215 *Soft* and *Foraminous Bodies*, in the *firſt Creation* of the *Sound*, will dead it; For the ſtriking againſt Cloth, or Furre, will make little *Sound*; As hath been ſaid: But in the *Paſſage* of the *Sound*, they will admit it better than *Harder Bodies*; As we ſee, that Curtaines, and Hangings, will not ſtay the *Sound* much; But Glaſſe-windowes, if they be very Cloſe, will check a

Sound more, than the like Thickneſſe of Cloth. We ſee alſo, in the Rumbling of the Belly, how eaſily the *Sound* paſſeth thorow the Guts, and Skin.

216 It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bels) become not more *Weak* and *Exile*, when they paſſe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be) may paſſe thorow *Small Crannies*, not confuſed; But the *Magnitude* of the *Sound* (perhaps,) not ſo well.

Experiments in Conſort, touching the *Medium* of *Sounds*.

THe *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Alſo *Water*. And *Hard Bodies* refuſe not altogether to be *Mediums* of *Sounds*. But all of them are dull and unapt *Deferents*, except the *Aire*.

217 In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* ſo well, as the more Denſe; As appeareth in *Night Sounds*; And *Evening Sounds*; And

218 *Sounds* in moiſt Weather, and Southern Winds. The reaſon is already mentioned in the *Title* of *Majoration* of *Sounds*; Being for that *Thin Aire* is better pierced, but *Thick Aire* preſerveth the *Sound* better from Waſte; Let further Triall be made by Hollowing in Miſts, and Gentle Showers: For (it may be) that will ſomewhat dead the *Sound*.

219 How farre forth *Flame* may be a *Medium* of *Sounds*, (eſpecially of ſuch *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is between; But then you muſt allow for ſome diſturbance, the *Noiſe* that the *Flame* it ſelfe maketh.

220 Whether any other *Liquours*, being made *Mediums*, cauſe a diverſity of *Sound* from *Water*, it may be tried: As by the Knapping or the Tongs; Or Striking the Bottome of a Veſſell, filled either with Milk, or with Oile; which though they be more light, yet are they more unequall Bodies than Aire.

Of the Natures *of the* Mediums, *we have now ſpoken*; *As for the* Diſpoſition *of the ſaid* Mediums, *it doth conſiſt in the* Penning, *or not* Penning *of the* Aire; *Of which we have ſpoken before, in the* Title *of* Delation *of* Sounds: *It conſiſteth alſo in the* Figure *of the* Concave, *through which it paſſeth*; *Of which we will ſpeak next.*

Experiments in Conſort what the *Figures* of the *Pipes*, or *Concaves*, or the *Bodies Deferent* conduce to the *Sounds*.

How the *Figures* of *Pipes*, or *Concaves*, through which *Sounds* paſſe; Or of other *Bodies deferent*; conduce to the variety and Alteration of the *Sounds*; Either in reſpect of the *Greater Quantity*, or *leſſe Quantity* of *Aire*, which the *Concaves* receive; Or in reſpect of the *Carrying* of *Sounds* longer or ſhorter way; Or in reſpect of many other *Circumſtances*; they have been touched, as falling into other *Titles*. But thoſe *Figures*, which we now are to ſpeak of, we intend to be, as they concern the *Lines*, through which *Sound* paſſeth; As *Straight*; *Crooked*; *Angular*; *Circular*; *&c.*

221 The *Figure* of a *Bell* partaketh of the *Pyramis*, but yet comming off, and dilating more ſuddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they have likewiſe *Straight Hornes*: which if they be of the ſame Bore with the *Oblique*, differ little in *Sound*: ſave that the Straight require ſomewhat a ſtronger Blaſt. The *Figure* of *Recorders*, and *Flutes*, and *Pipes* are ſtraight; But the *Recorder* hath a leſſe Bore, and a greater; Above, and below. The *Trumpet* hath the *Figure* of the *Letter S*: which maketh that

Purling

Purling *Sound &c.* Generally, the *Straight Line* hath the cleaneſt and roundeſt *Sound*, And the *Crooked* the more *Hoarſe*, and Jarring.

222 Of a *Sinuous Pipe*, that may have ſome foure Flexions, Triall would be made. Likewiſe of a *Pipe*, made like a *Croſſe*, open in the middeſt. And ſo likewiſe of an *Angular Pipe*: And ſee what will be the Effects of theſe ſeverall *Sounds*. And ſo again of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you ſhall blow; And another Hole not farre from that; But with a Traverſe or Stop between them; So that your Breath may go the Round of the *Circle*, and come forth at the ſecond Hole. You may try likewiſe *Percuſſions* of *Solid Bodies* of ſeverall *Figures*; As *Globes*, *Flats*, *Cubes*, *Croſſes*, *Triangles*, *&c.* And their *Combinations*; As *Flat* againſt *Flat*: And *Convex* againſt *Convex*: And *Convex* againſt *Flat &c.* And mark well the diverſities of the *Sounds*. Try alſo the difference in *Sound* of ſeverall *Craſſitudes* of *Hard Bodies* percuſſed: And take knowledge of the diverſities of the *Sounds*. I my ſelfe have tried, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferior to that of *Silver*, or *Braſſe*, but rather better: yet we ſee that a piece of Money of *Gold* ſoundeth farre more flat than a piece of Money of *Silver*.

223 The *Harpe* hath the *Concave*, not along the *Strings*, but acroſſe the *Strings*; And no *Inſtrument* hath the *Sound* ſo Melting, and Prolonged, as the *Iriſh Harpe*. So as I ſuppoſe, that if a *Virginall* were made with a double *Concave*; the one all the length as the *Virginall* hath; the other at the End of the *Strings*, as the *Harpe* hath; It muſt needs make the *Sound* perfecter, and not ſo Shallow, and Jarring. You may try it, without any Sound-Board along, but onely Harp-wiſe, at one End of the *Strings*: Or laſtly with a double *Concave*, at Each end of the *Strings* one.

Experiments in Conſort, touching the *Mixture* of *Sounds*.

THere is an apparent Diverſity between the *Species Viſible*, and *Audible*, in this; That the *Viſible* doth not *mingle* in the *Medium*, but the *Audible* doth. For if we look abroad, we ſee Heaven, a number of Starres, Trees, Hills, Men, Beaſts, at once. And the *Species* of the one doth not confound the other. But if ſo many *Sounds* come from ſeverall Parts, one of them would utterly confound the other. So we ſee, that *Voices* or *Conſorts* of *Muſick* doe make an Harmony by *Mixture*, which *Colours* do not. It is true nevertheleſſe, that a great *Light* drowneth a ſmaller, that it cannot be ſeen; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a leſſer. And I ſuppoſe likewiſe, that if there were two Lanthornes of Glaſſe, the one a Crimſin, and the other an Azure, and a Candle within either of them, thoſe Coloured Lights would mingle and caſt upon a White Paper a Purple Colour. And even in *Colours*, they yeeld a faint and weak *Mixture*: For white walls make Roomes more lightſome than black, &c. But the Cauſe of the *Confuſion* in *Sounds*, and the *Inconfuſion* in *Species Viſible*, is, For that the *Sight* worketh in Right Lines, and maketh ſeverall *Cones*; And ſo there can be no Coincidence in the Eye, or Viſuall Point: But *Sounds* that move in Oblique and Arcuate Lines, muſt needs encounter, and diſturbe the one the other.

225 The ſweeteſt and beſt *Harmony* is, when every *Part* or *Inſtrument*, is not heard by it ſelfe, but a Conflation of them all; Which requireth to ſtand ſome diſtance off. Even as it is in the *Mixture* of Perfumes; Or the Taking of the Smels of ſeverall *Flowers* in the *Aire*.

226 The *Diſpoſition* of the *Aire*, in other *Qualities*, except it be joyned with *Sound*, hath no great Operation upon *Sounds*: For whether the *Aire* be

lightſome or dark, hot or cold, quiet or ſtirring, (except it be with *Noiſe*) ſweet-ſmelling, or ſtinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

227 But *Sounds* doe diſturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one jarring and diſcording with the other, and making a Confuſion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

228 Two *Voices* of like *lowdneſſe*, will not be heard twice as farre, as one of them alone; And two *Candles* of like light, will not make things ſeeme twice as farre off, as one. The Cauſe is profound; But it ſeemeth that the *Impreſſions* from the *Objects* of the *Senſes*, doe *mingle* reſpectively, every one with his kind; But not in proportion, as is before demonſtrated: And the reaſon may be, becauſe the firſt *Impreſſion*, which is from *Privative* to *Active* (As from *Silence* to *Noiſe*, or from *Darkneſſe* to *Light*,) is a greater Degree, than from *Leſſe Noiſe*, to *More Noiſe*, or from *Leſſe Light* to *More Light*. And the Reaſon of that again may be; For that the *Aire*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the firſt Charge. As for the Encreaſe of Vertue, generally, what Proportion it beareth to the Encreaſe of the Matter, it is a large Field, and to be handled by it ſelfe.

Experiments in Conſort touching *Melioration* of *Sounds*.

ALL *Reflexions Concurrent* do make *Sounds* Greater; But if the Body that createth, either the Originall *Sound*, or the *Reflexion*, be clean and ſmooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of poliſhed Braſſe, in ſtead of Wood. We ſee that even in the Open Aire, the *Wire String* is ſweeter, than the *String* of *Guts*. And we ſee that for *Reflexion*, *Water* excelleth; As in *Muſick* near the *Water*; Or in *Eccho's*.

229

230 It hath been tryed, that a *Pipe* a little moiſtned on the inſide, but yet ſo as there be no Drops left, maketh a more ſolemne *Sound*, than if the *Pipe* were dry: But yet with a ſweet Degree of *Sibilation*, or *Purling*; As we touched it before in the title of *Equality*. The Cauſe is, for that all Things Porous, being ſuperficially wet, and (as it were) between dry and wet, become a little more Even and Smooth; But the Purling, (which muſt needs proceed of Inequality,) I take to be bred between the Smoothneſſe of the inward Surface of the *Pipe*, which is wet; And the Reſt of the Wood of the *Pipe*, unto which the Wet commeth not, but it remaineth dry.

231 In *Froſty Weather*, *Muſick* within doors ſoundeth better. Which may be, by reaſon, not of the Diſpoſition of the *Aire*, but of the *Wood* or *String* of the *Inſtrument*, which is made more Criſpe, and ſo more porous and hollow: And we ſee that *Old Lutes* ſound better than *New*, for the ſame reaſon. And ſo doe *Lute-ſtrings* that have been kept long.

232 *Sound* is likewiſe *Meliorated* by the *Mingling* of *Open Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot over the Strings; yet ſo, as there be Room enough for the Strings, and Room enough to play below that Belly. Triall may be alſo of an *Iriſh Harpe*, with a Concave on both Sides; whereas it uſeth to have it but on one Side. The doubt may be, leſt it ſhould make too much Reſounding; whereby one Note would overtake another.

233 If you ſing in the Hole of a *Drum*, it maketh the *Singing* more ſweet. And ſo I conceive it would, if it were a *Song* in Parts, ſung into ſeverall *Drums*; And for handſomneſſe and ſtrangeneſſe ſake, it would not be amiſſe to have a Curtain between the Place, where the *Drums* are, and the *Hearers*.

When

When a *Sound* is created in a *Wind-Inſtrument*, between the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a Trumpet, or *Pipe* of *Wood*; And again in a *Trumpet* or *Pipe* of *Braſſe*. It were good to try *Recorders* and *Hunters Hornes* of *Braſſe*, what the *Sound would* be. 234

Sounds are *meliorated* by the *Intenſion* of the *Senſe*, where the *Common Senſe* is collected moſt, to the *particular Senſe* of *Hearing*, and the *Sight* ſuſpended: and therefore, *Sounds* are ſweeter, (as well as greater,) in the *Night*, than in the *Day*; And I ſuppoſe, they are ſweeter to blind Men, than to Others: And it is manifeſt, that between *Sleeping* and *Waking*, (when all the *Senſes* are bound and ſuſpended) *Muſick* is farre ſweeter, than when one is *fully waking*. 235

Experiments in Conſort touching the *Imitation* of *Sounds*.

IT is a Thing ſtrange in Nature, when it is attentively conſidered; How *Children*, and ſome *Birds*, learn to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that ſpeaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquiſite: So one would think it were a Leſſon hard to learn. It is true, that it is done with time, and by little and litle, and with many Eſſays and Proffers: But all this diſchargeth not the Wonder. It would make a Man think (though this which we ſhall ſay may ſeem exceeding ſtrange) that there is ſome *Tranſmiſſion* of Spirits; and that the *Spirits* of the *Teacher* put in Motion, ſhould worke with the *Spirits* of the *Learner*, a Pre-diſpoſition to offer to *Imitate*; And ſo to perfect the *Imitation* by degrees. But touching *Operations* by *Tranſmiſſions* of *Spirits*, (which is one of the higheſt ſecrets in Nature,) we ſhall ſpeak in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a pre-diſpoſition to *Imitate*. We ſee how ready Apes and Monkies are, to *imitate* all Motions of Man: And in the Catching of Dottrells, we ſee, how the Fooliſh Bird playeth the Ape in Geſtures: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) ſome Geſture, or Voice, or Faſhion of the other. 236

In *Imitation* of *Sounds*, that *Man* ſhould be the *Teacher*, is no Part of the Matter; For *Birds* will learn one of another; And there is no Reward, by feeding, or the like, given them for the *Imitation*; And beſides, you ſhall have Parrots, that will not onely *imitate* Voices, but Laughing, Knocking, Squeaking of a Doore upon the Hinges, or of a Cart-wheele; And (in effect) any other *Noiſe* they heare. 237

No *Beaſt* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape it ſelfe, that is ſo ready to *imitate* otherwiſe, attaineth not any degree of *Imitation* of Speech. It is true, that I have known a Dog, that if one howled in his Eare, he would fall a howling a great while. What ſhould be the Aptneſſe of *Birds*, in compariſon of *Beaſts*, to *imitate* the *Speech* of *Man*, may be further enquired. We ſee that *Beaſts* have thoſe Parts, which they count the *Inſtruments* of *Speech*, (as *Lips*, *Teeth*, *&c.*) liker unto *Man*, than *Birds*. As for the *Neck*, by which the *Throat* paſſeth; we ſee many *Beaſts* have it, for the Length, as much as *Birds*. What better *Gorge*, or Attire, *Birds* have, may be further enquired. The *Birds* that are known to be Speakers, are, *Parrats*, *Pyes*, *Jayes*, *Dawes*, and *Ravens*. Of which *Parrats* have an adunque Bill, but the reſt not. 238

But I conceive, that the *Aptneſſe* of *Birds*, is not ſo much in the *Conformity* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* muſt come by *Hearing*, 239

Hearing, and *Learning*; And *Birds* give more heed, and mark *Sounds*, more than *Beaſts*; Becauſe naturally they are more delighted with them, and practiſe them more; As appeareth in their *Singing*. We ſee alſo, that thoſe that teach *Birds* to ſing, doe keep them Waking, to increaſe their *Attention*. We ſee alſo, that *Cock-Birds*, amongſt *Singing-Birds*, are ever the better *Singers*; which may be, becauſe they are more lively, and liſten more.

240 *Labour*, and *Intention* to imitate *Voyces*, doth conduce much to *Imitation*: And therefore we ſee, that there be certain *Pantomimi*, that will repreſent the voyces of *Players* of *interludes*, ſo to life, as if you ſee them not, you would think they were thoſe *Players* themſelves; And ſo the *Voyces* of other *Men* that they heare.

241 There have been ſome, that could counterfeit the *Diſtance* of *Voyces*, (which is a *Secondary Object* of *Hearing*,) in ſuch ſort; As when they ſtand faſt by you, you would think the *Speech* came from a farre off, in a fearfull manner. How this is done, may be further enquired. But I ſee no great uſe of it, but for Impoſture, in counterfeiting Ghoſts or Spirits.

Experiments in Conſort touching the *Reflexion* of *Sounds*.

There be three Kindes of *Reflexions* of *Sounds*; A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the firſt hath been handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now ſpeak of.

242 The *Reflexion* of *Species Viſible*, by *Mirrours*, you may command; Becauſe paſſing in Right Lines, they may be guided to any point: But the *Reflexion* of *Sounds* is hard to maſter; Becauſe the *Sound* filling great Spaces in Arched Lines, cannot be ſo guided: And therefore we ſee there hath not been practiſed, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already known returneth in a very narrow Room.

243 The *Naturall Eccho's* are made upon *Walls*, *Woods*, *Rocks*, *Hills*, and *Bancks*; As for *Waters*, being neare, they make a *Concurrent Eccho*; but being further off, (as upon a large *River*) they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the Quickneſſe, or Slowneſſe of the Return. But there is no doubt, but *Water* doth help the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certaine, (as hath been formerly touched,) that if you ſpeak thorow a *Trunk*, ſtopped at the further end; you ſhall find a Blaſt return upon your Mouth, but no *Sound* at all. The *Cauſe* is, for that the *Cloſeneſſe*, which preſerveth the *Originall*, is not able to preſerve the *Reflected Sound*: Beſides that *Eccho's* are ſeldome created, but by loud *Sounds*. And therefore there is leſſe hope of *Artificial Eccho's* in Aire, pent in a narrow Concave. Nevertheleſſe it hath been tried, that one leaning over a *Well*, of 25. Fathome deep, and ſpeaking, though but ſoftly, (yet not ſo ſoft as a whiſper,) the *Water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caves*, where there is no Iſſue, ſave where you ſpeak, will not yeeld *Eccho's*, as *Wells* do.

245 The *Eccho* commeth as the *Originall Sound doth*, in a round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercuſſing maketh an Angle: As againſt the Return of a Wall, &c. Alſo we ſee that in *Mirrours*, there is the like Angle of Incidence, from the Object to the Glaſſe, and from the Glaſſe to the Eye. And if you ſtrike a *Ball* ſide-long, not full upon the Surface, the Rebound will be as much the contrary way; Whether

ther there be any ſuch *Reſilience* in *Eccho's*, (that is, whether a Man ſhall heat better, if he ſtand aſide the Body Repercuſſing, than if he ſtand where he ſpeaketh, or any where in a right Line between;) may be tried. Triall likewiſe would be made, by Standing nearer the place of Repercuſſing, than he that ſpeaketh; And again by Standing further off, than he that ſpeaketh; And ſo knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not ſtrongeſt neare hand.

There be many Places, where you ſhall heare a number of *Eccho's* one after another: And it is, when there is Variety of *Hills* or *Woods*, ſome nearer, ſome further off: So that the Returne from the further, being laſt created, will be likewiſe laſt heard. 246

As the *Voice* goeth round, as well towards the Back, as towards the Front of him that ſpeaketh: So likewiſe doth the *Eccho*; For you have many Back-*Eccho's* to the Place where you ſtand. 247

To make an *Eccho*, that will report, three or foure, or five Words, diſtinctly, it is requiſite, that the *Body Repercuſſing*, be a good diſtance off: For if it be neare, and yet not ſo neare, as to make a *Concurrent Eccho*, it choppeth with you upon the ſudden. It is requiſite likewiſe, that the *Aire* be not much *pent*. For *Aire*, at a great diſtance, *pent*, worketh the ſame effect with *Aire*, at *large*, in a ſmall diſtance. And therefore in the *Triall* of *Speaking* in the *Well*, though the *Well* was deep, the *Voice* came back, ſuddenly; And would beare the Report but of two Words. 248

For *Eccho's* upon *Eccho's*, there is a rare Inſtance thereof in a Place, which I will now exactly deſcribe. It is ſome three or foure Miles from *Paris*, neare a Towne called *Font-Charenton*; And ſome Bird-bolt ſhot, or more, from the River of *Seane*. The Roome is a *Chappell*, or ſmall *Church*. The Walls all ſtanding, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Iſles of *Churches*, alſo ſtanding; The Roofe all open, not ſo much as any Embowment neere any of the walls left. There was againſt every Pillar, a Stack of Billets, above a Mans Height; which the Watermen, that bring Wood down the *Seane*, in Stacks, and not in Boats, laid there (as it ſeemeth) for their eaſe. Speaking at the one End, I did heare it return the Voice thirteen ſeverall times; And I have heard of others, that it would return ſixteen times: For I was there about three of the Clock in the afternoone: And it is beſt, (as all other *Eccho's* are) in the Evening. It is manifeſt, that it is not *Eccho's* from ſeverall places, but a *Toſſing* of the *Voice*, as a Ball, to and fro; Like to *Reflexions* in *Looking-glaſſes*; where if you place one *Glaſſe* before, and another behind, you ſhall ſee the *Glaſſe* behind with the *Image*, within the *Glaſſe* before; And again, the *Glaſſe* before in that; and divers ſuch *Super-Reflexions*, till the *ſpecies ſpeciei* at laſt die. For it is every Return weaker, and more ſhady. In like manner, the *Voice* in that *Chappell*, createth *ſpeciem ſpeciei*, and maketh ſucceeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you ſpeak three Words, it will (perhaps) ſome three times report you the whole three Words; And then the two latter Words for ſome times; And then the laſt Word alone for ſome times; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or five Words; In this *Eccho* of ſo many Returnes, upon the matter, you heare above twenty Words for three. 249

The like *Eccho* upon *Eccho*, but only with two Reports, hath been obſerved, to be, if you ſtand betweed a *Houſe*, and a *Hill*, and lure towards the 250

Hill

Hill. For the *Houſe* will give a *Back Eccho*; One taking it from the other, and the latter the weaker.

251 There are certaine *Letters*, that an *Eccho* will hardly expreſſe; As *S*, for one, Eſpecially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Pariſian*, that took it to be the Work of Spirits, and of good Spirits. For, (ſaid he) call *Satan*, and the *Eccho* will not deliver back the Devils name; But will ſay, *Va'en*; Which is as much in *French*, as *Apage*, or *Avoid*. And thereby I did hap to find, that an *Eccho* would not return *S*, being but a Hiſſing and an *Interiour Sound*.

252 *Eccho's* are ſome more ſudden, and chop againe, as ſoone as the *Voice* is delivered; As hath been partly ſaid: Others are more deliberate, that is give more Space between the *Voice*, and the *Eccho*; which is cauſed by the locall Nearneſſe, or Diſtance: Some will report a longer Train of Words. And ſome a ſhorter: Some more loud (full as loud as the *Originall*, and ſometimes more loud;) And ſome weaker and fainter.

253 Where *Eccho's* come from ſeverall Parts, at the ſame diſtance, they muſt needs make (as it were) a Quire of *Eccho's*, and ſo make the Report greater, and even a *Continued Eccho*; which you ſhall find in ſome *Hills*, that ſtand encompaſſed, Theatre-like.

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Viſible*. For I doe not think, that if a *Sound* ſhould paſſe through divers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that unto which it is deferred; which is the Proper Effect of *Refraction*. But *Majoration* which is alſo the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath been handled at full;) But it is not by Diverſity of *Mediums*.

Experiments in Conſort touching the *Conſent* and *Diſſent* between *Viſibles* and *Audibles*.

Wee have *obiter*, for Demonſtrations ſake, uſed in divers *Inſtances*, the *Examples* of the *Sight*, and *Things Viſible*, to illuſtrate the *Nature* of *Sounds*. But we think good now to proſecute that *Compariſon* more fully.

CONSENT OF VISIBLES and Audibles.

155 *Both* of them *ſpread themſelves in Round*, and fill a whole Floare or Orbe, unto certaine Limits: And are carried a great way. And doe languiſh and leſſen by degrees, according to the Diſtance of the objects from the Senſories.

256 *Both* of them have the whole *Species in every ſmall portion of the Aire* or *Medium*, So as the *Species* doe paſſe through ſmall Cranies, without Confuſion: As we ſee ordinarily in *Levels*, as to the *Eye*; And in *Cranies*, or *Chinks*, as to the *Sound*.

257 *Both* of them are of a *ſudden and eaſie Generation* and *Delation*; And likewiſe *periſh ſwiftly*, and *ſuddenly*; As if you remove the *Light*; Or touch the *Bodies* that give the *Sound*.

Both

Both of them doe *receive* and *carry exquisite* and *accurate Differences*; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quaverings, in *Audibles*. 258

Both of them in their Vertue and Working, do not appeare to *emit any Corporal Substance* into their *Mediums*, or the Orbe of their Vertue; Neither again to rise or stir any *evident locall Motion* in their *Mediums*, as they passe; But only to carry certain *Spirituall Species*; The perfect knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place. 259

Both of them seeme not to *generate* or *produce* any other *Effect in Nature*, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren. 260

But *Both* of them in their owne proper Action, doe work three manifest *Effects*. The First, in that the *Stronger species drowneth the Lesser*; As the Light of the Sun, the light of a Glow-worm; The Report of an Ordnance, the Voice; The Second, in that an *Object of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sun the Eye, a violent *Sound* (neare the Eare) the Hearing: The Third, in that *both of them will be reverberate*; As in *Mirrours*; And in *Eccho's*. 261

Neither of them doth *destroy or hinder the Species of the other*, although they *encounter* in the same *Medium*; As Light or Colour hinder not *Sound*; Nor è *contrà*. 262

Both of them *affect the Sense in Living Creatures*, and yeeld *Objects of Pleasure and Dislike*: Yet nevertheless, the *Objects* of them do also (if it be well observed) affect and worke upon dead Things; Namely such, as have some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke upon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* upon the Places of *Eccho*, which resemble, in some sort, the Caverne and structure of the Eare. 263

Both of them do *diversly work, as they have their Medium diversly disposed*. So a Trembling *Medium* (as Smoak) maketh the Object seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall. 264

To *Both*, the *Medium*, which is the most Propitious and Conducible, is *Aire*; For Glasse or Water, &c. are not comparable. 265

In *Both* of them, where the *object is Fine and Accurate*, it conduceth much to have the *Sense Intentive, and Erect*; Insomuch as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentively; which in Beasts that have Eares moveable, is most manifest. 266

The *Beames* of *Light*, when they are *multiplyed*, and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*, which is an Action materiate, differing from the Action of *Sound*; If it be true (which is anciently reported) that *Birds*, with great shouts, have fallen down. 267

DIS-

DISSENTS OF VISIBLES and Audibles.

268 THe *Species* of *Visibles* seem to be *Emissions* of *Beames* from the *Object seen*; Almost like Odours, save that they are more Incorporeall: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions*, or *Impressions* made upon the *Aire*. So that whereas all Bodies doe seeme to work in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to be carried more manifestly thorow the *Aire* than the *Species* of *Visibles*: For (I conceive) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it it will do the Hearing of *Sounds*.

270 There is one *Difference*, above all others, between *Visibles* and *Audibles*, that is the most remarkable; as that whereupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are *carried in Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies be cleare, and the Pores in a Right Line, as in Glasse, Crystall, Diamonds, Water, &c. But a thin Scarfe, or Handkerchiefe, though they be Bodies nothing so solid, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but solid Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small Glasses suffice, but to the *Reverberation* of *Audibles*, are required greater Spaces, as hath likewise been said before.

271 *Visibles* are seen further off, than *Sounds* are heard; Allowing nevertheless the *Rate* of their *Bigneste*: For otherwise a *great Sound* will be heard further off, than a *Small Body* seen.

272 *Visibles* require (generally) some *Distance* between the *Object*, and the *Eye*, to be better seen; Whereas in *Audibles*, the nearer the Approch of the *Sound* is to the Sense, the better. But in this there may be a double Error. The one because to *Seeing*, there is required *Light*; And any thing that toucheth the Pupill of the Eye (all over,) excludeth the *Light*. For I have heard of a Person very credible, (who himselfe was cured of a Cataract in one of his Eyes,) that while the Silver Needle did work upon the Sight of his Eye, to remove the Filme of the Cataract, he never saw any thing more cleare or perfect, than that white Needle: Which (no doubt,) was, because the Needle was lesser than the *Pupill* of the *Eye*, and so took not the Light from it. The other Errour may be, for that the *Object* of *Sight* doth strike upon the *pupill* of the *Eye*, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the *Sound* a little from the Organ: And so nevertheless there is some *Distance* required in both.

273 *Visibles* are swiftlier carried to the *Sense*, than *Audibles*: As appeareth in Thunder

Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which have been set downe heretofore, but are proper for this *Title*.

I conceive also, that the *Species* of *Audibles*, doe hang longer in the Aire than those of *Visibles*: For although even those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute strings* fillipped; *A Fire-brand* carried along, which leaveth a Train of Light behind it; and in the *Twilight*; And the like: Yet I conceive that *Sounds* stay longer, because they are carried up and down with the Wind: And because of the Distance of the Time, in *Ordnance discharged*, and *heard* twenty Miles off. 274

In *Visibles*, there are not found Objects so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Objects. And therefore in *Pictures*, those foule Sights do not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge; And any of the *harsh Discords* in *Musick*, the Eare doth straight-wayes refuse. 275

In *Visibles*, after great Light, if you come suddenly into the *Dark*; Or contrariwise, out of the *Dark* into a *Glaring light*, The Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after *a deep Silence*, may be better enquired. It is an old Tradition, that those that dwell near the *Catarracts* of *Nilus*, are stricken deafe: But we find no such effect, in Cannoniers, nor Millers, nor those that dwell upon Bridges. 276

It seemeth that the *Impression* of *Colour* is so weak, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the Object, and the Verticall Point in the Eye; So as there is a Corradiation and Conjunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speak not. For the *Beames* passe, and give little Tincture to that Aire, which is Adjacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreen between the Candle and the Eye, yet the *Light* passeth to the Paper whereon one writeth; So that the *Light* is seen where the Body of the *Flame* is not seen; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not be seen. I judge that *Sound* is of this Latter Nature: For when two are placed on both sides of a Wall, and the Voice is heard, I judge it is not onely the *Originall Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth above the Wall in a Right Line, begetteth the like Motion round about it, as the first did, though more weak. 277

ALL *Concords* and *Discords* of *Musick*, are (no doubt) *Sympathies* and *Antipathies* of *Sounds*. And so (likewise) in that *Musick*, which we call *Broken Musick*, or *Consort Musick*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet observed:) As the *Irish Harp*, and *Base Viall* agree well: The *Recorder* and *Stringed Musick* agree well: *Organs* and the *Voice* agree well, &c. But the *Virginalls* and the *Lute*, Or the *Welch-Harp*; and *Irish-Harp*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musick* there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire. 278

Experiments in Consort touching the *Sympathy* or *Antipathy* of *Sounds*, one with another.

279 There is a Common Obſervation, that if a *Lute*, or *Viall*, be layed upon the Back, with a ſmall Straw upon one ſide of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute*, or *Viall*, the *Vniſon* to that *String* be ſtrucken; it will make the *String* move; Which will appeare both to the Eye, and by the *Straws* falling off. The like will be, if the *Diapaſon* or *Eight* to that *String* be ſtrucken, either in the ſame *Lute*, or *Viall*, or in others lying by; But in none of theſe there is any Report of *Sound*, that can be diſcerned, but onely Motion.

280 It was deviſed, that a *Viall* ſhould have a Lay of Wire Strings below, as cloſe to the Belly as a *Lute*; And then the *Strings* of Guts mounted upon a Bridg, as in Ordinary *Vialls*; To the end, that by this means, the upper *Strings* ſtrucken, ſhould make the lower reſound by *Sympathy*, and ſo make the *Muſick* the better; Which, if it be to purpoſe, then *Sympathy* worketh as well by Report of *Sound*, as by *Motion*. But this deviſe I conceive to be of no uſe, becauſe the upper *Strings*, which are ſtopped in great variety, cannot maintaine a *Diapaſon* or *Vniſon*, with the Lower, which are never ſtopped. But if it ſhould be of uſe at all; it muſt be in *Inſtruments* which have no Stops; as *Virginalls*, and *Harpes*; wherein triall may be made of two Rowes of Strings, diſtant the one from the other.

281 The *Experiment* of *Sympathy* may be transferred (perhaps) from *Inſtruments* of *Strings* to other *Inſtruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vniſon*, whether the ſtriking of the one would move the other, more then if it were another Accord: And ſo in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would move in the one *Pipe*, when the other is blown at an *Vniſon*.

282 It ſeemeth both in *Eare*, and *Eye*, the *Inſtrument* of *Senſe* hath a *Sympathy* or Similitude with that which giveth the *Reflexion*; (As hath been touched before.) For as the *Sight* of the *Eye* is like a Cryſtall, or Glaſſe, or Water; So is the *Eare* a ſinuous Cave, with a hard Bone, to ſtop and reverberate the *Sound*: Which is like to the Places that report *Eccho's*.

Experiments in Conſort touching the *Hindring* or *Helping* of the *Hearing*.

WHen a Man *Yawneth*, he cannot *Heare* ſo well. The *Cauſe* is for that the *Membrane* of the *Eare* is extended; And ſo rather caſteth off the *Sound*, than draweth it to.

283 We *Heare* better when we *hold our Breath*, than contrary; In ſo much as in
284 all Liſtening to attain a *Sound* a farre off, Men *hold their Breath*. The *Cauſe* is, For that in all *Expiration*, the Motion is Outwards; and therefore, rather driveth away the voice, than draweth it: And beſides we ſee, that in all *Labour* to doe things with any ſtrength, we *hold the Breath*: And liſtening after any *Sound*, that is heard with difficulty, is a kind of *Labour*.

285 Let it be tried, for the *Help* of the *Hearing*, (and I conceive it likely to ſucceed,) to make an *Inſtrument* like a *Tunnell*; The narrow Part whereof may be of the Bigneſſe of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow End of it be ſet cloſe to the *Eare*: And mark whether any *Sound* abroad in the open Air, will not be heard diſtinctly, from further diſtance, than without that Inſtrument; being (as it were) an *Eare-Spectacle*. And I have heard there is in *Spaine*, an *Inſtrument* in uſe to be ſet to the *Eare*, that *helpeth* ſomewhat thoſe that are Thick of Hearing.

286 If the *Mouth* be ſhut Cloſe, nevertheleſſe there is yeelded by the Roof of the mouth, a Murmur. Such as is uſed by dumbe Men: But if the *Noſtrills* be likewiſe ſtopped, no ſuch Murmur can be made; Except it be in the Bottome

tome of the Pallate towards the Throat. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as aforesaid, if the *Mouth* be stopped, passeth from the *Pallate* through the *Nostrills*.

Experiments in Consort, touching the *Spirituall* and *Fine Nature* of *Sounds*.

287

THe *Repercussion* of *Sounds*, (which we call *Eccho*,) is a great Argument of the *Spirituall Essence* of *Sounds*. For if it were *Corporeall*, the Repercussing should be created in the same manner, and by like *Instruments*, with the *Originall Sound*: But we see what a Number of *Exquisite Instruments* must concurre in Speaking of Words, whereof there is no such Matter in the *Returning* of them; But onely a plain Stop, and *Repercussion*.

288

The Exquisite *Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath been well refuted by the Ancients. For it is true, that Seales make excellent Impressions: And so it may be thought of *Sounds* in their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot be Impressions.

289

All *Sounds* are suddenly made, and do suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration: For the Quaverings, and Warblings in Lutes, and Pipes, are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are uttered. But that *Sounds* should not onely be so speedily generated, but carried so farre every way, in such a momentany time, deserveth more Admiration. As for Example; If a Man stand in the Middle of a Field, and speak aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in every little Portion of the Aire; And this shall be done in the Space of lesse than a Minute.

290

The *Sudden Generation* and *Perishing of Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound*, and then restoreth it selfe; As Water doth; Which being divided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; for that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiving the *Sound* at the first; But then other Grosse and more Materiate Qualities of the Aire straight-wayes suffocate it; Like unto *Flame*, which is generated with Alacrity, but straight quenched by the Enmity of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are divided; 1. *Musicall*, *Immusicall*; 2. *Treble*, *Base*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Cleane*, *Harsh* or *Puling*; 7. *Articulate*, *Inarticulate*.

We have laboured (as may appear) in this *Inquisition* of *Sounds*, diligently; Both becaufe *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning:) And because it is a *Vertue* which may be called *Incorporeal*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a Patterne or President of an

Exact Inquiſition; And we ſhall doe the like hereafter in ſome other Subjects which require it. For we deſire that Men ſhould learne and perceive, how ſevere a Thing the true *Inquiſition* of *Nature* is; And ſhould accuſtome themſelves, by the light of Particulars, to inlarge their Mindes, to the Amplitude of the World; and not reduce the World to the Narrowneſſe of their Mindes.

Experiment Solitary touching the *Orient Colours*, in *Diſſolution* of *Metalls*. 291

Metalls give *Orient* and *Fine Colours* in *Diſſolutions*; As *Gold* giveth an excellent Yellow; *Quick-Silver* an excellent Greene; *Tinne* giveth an excellent Azure: Likewiſe in their *Putrefactions*, or *Ruſts*; As *Vermilion*, *Verdegreaſe*, *Biſe*, *Cirrus*, *&c.* And likewiſe in their *Vitrifications*. The *Cauſe* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Poſture; And again to retain Part of their principall Spirit; Which two Things, (Equall Poſture, and Quick Spirits) are required chiefly, to make *Colours* lightſome.

Experiment Solitary touching *Prolongation* of *Life*. 292

It conduceth unto *Long Life*, and to the more Placide Motion of the Spirits, which thereby do leſſe prey and conſume the Juyce of the Body; Either that *Mens Actions be free and Volantary*; that nothing be done *Invitâ Minervâ*, but *Secundum genium*: Or on the other ſide, that the *Actions* of *Man be full of Regulation, and Commands within themſelves*: For then the Victory and Performing of the Command, giveth a good Diſpoſition to the Spirits; Eſpecially if there be a Proceeding from Degree to Degree; For then the Senſe of Victory is the greater. An example of the former of theſe, is in a Country life; And of the latter, in *Monkes* and *Philoſophers*, and ſuch as do continually enjoyne themſelves.

Experiment Solitary touching *Appetite* of *Vnion* in *Bodies*. 393

It is certain, that in all Bodies, there is an *Appetite* of *Vnion*, and Evitation of Solution of Continuity: And of this *Appetite* there be many *Degrees*; But the moſt Remarkable, and fit to be diſtinguiſhed, are three. The firſt in *Liquours*; The ſecond in *Hard Bodies*: And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*, this *Appetite* is weak. We ſee in *Liquours*, the *Threedding* of them in *Stillicides*, (as hath been ſaid;) The *Falling* of them in *Round Drops*, (which is the form of *Vnion*;) And the *Staying* of them for a little time, in *Bubbles and Froth*. In the ſecond *Degree* or *Kinde*, this *Appetite* is ſtrong; As in *Iron*, in *Stone*, in *Wood*, *&c.* In the third, this *Appetite* is in a *Medium* between the other two: For ſuch *Bodies* doe partly follow the Touch of another Body; And partly ſtick and continue to themſelves; And therefore they roape, and draw themſelves in Threds; as we ſee in *Pitch*, *Glew*, *Birdlime*, *&c.* But note, that all *Solide Bodies* are *Cleaving*, more or leſſe: and that they love better the Touch of ſomewhat that is *Tangible*, than of *Aire*. For *Water*, in ſmall quantity, cleaveth to any Thing that is Solide; And ſo would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaveth: But thoſe *Bodies* which are noted to be Clammy, and Cleaving, are ſuch, as have a more indifferent *Appetite* (at once,) to follow another *Body*, And to hold to themſelves. And therefore they are commonly *Bodies* ill mixed; And which take more pleaſure in a Forrain Body, than in preſerving their own *Conſiſtence*; And which have little predominance in *Drought* or *Moiſture*.

Time

Experiment Solitary touching the *like Operations* of *Heat*, and *Time*. 294

Time, and *Heat*, are Fellows in many Effects. *Heat* drieth Bodies, that do easily expire; As Parchment, Leaves, Roots, Clay, &c. And, so doth *Time* or *Age* arefie; As in the same Bodies, &c. *Heat* dissolveth and melteth Bodies, that keep in their Spirits; As in divers *Liquefactions*; And so doth *Time*, in some Bodies of a softer Consistence: As is manifest in Honey, which by *Age* waxeth more liquid; And the like in Sugar; And so in old Oyle, which is ever more cleare and more hot in Medicinable use. *Heat* causeth the Spirits to search some Issue out of the Body; as in the *Volatility* of *Metals*; And so doth *Time*; As in the *Rust* of *Metals*. But generally *Heat* doth that in small time, which *Age* doth in long.

Experiment Solitary touching the *differing Operations* of *Fire*, and *Time*. 295

SOme Things which passe the *Fire* are softest at first, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards give again, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The *Cause* is, for that in those things which wax Hard with *Time*, the Work of the *Fire* is a Kind of *Melting*: And in those that wax soft with *Time*, (contrariwise,) the work of the *Fire* is a Kind of *Baking*; And whatsoever the *Fire* baketh, *Time* doth in some degree dissolve.

Experiment Solitary, touching *Motions* by *Imitation*. 296

Motions passe from one Man to another, not so much by Exciting Imagination; as by Invitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*; and *Stretching* do passe from Man to Man; For that that causeth *Gaping* or *Stretching* is, when the Spirits are a little Heavy, by any Vapour, or the like. For then they strive (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleep; Or before the Fit of an Ague; doe use to Yawne and Stretch; And doe likewise yeeld a *Voyce* or *Sound*, which is an *Interjection* of *Expulsion*: So that if another be apt and prepared to do the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment Solitary touching *Infectious Diseases*. 297

THere be some knowne *Diseases* that are *Infectious*; And others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*: and such like. Secondly, such as *Taint* the *Breath*; Which we see passeth manifestly from Man to Man; And not invisible, as the *Affects* of the *Spirits* do: Such are *Consumptions* of the *Lungs &c.* Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adjacent*; Especially if they consist in an Unctuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprosie*. Fourthly, such as are meerely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they never infect, but by *Touch* onely; And such a *Touch* also, as commeth within the *Epidermis*; As the the venome of the *French Pox*; And the *Biting* of a *Mad Dog*.

Experiment Solitary touching the *Incorporation* of *Powders*, and *Liquours*. 298

MOst *Powders* grow more Close and Coherent by *Mixture* of *Water* than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; as *Meale*, *&c.* The Reason is the Congruity of Bodies; which if it be more, maketh a Perfecter Imbibition, and Incorporation; Which in most *Powders* is more between *Them* and *Water*, then between *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiments Solitary touching *Exerciſe* of the *Body*.
299

MUch *Motion* and *Exerciſe* is good for ſome *Bodies*; And *Sitting*, and *leſſe Motion* for others. If the Body be Hot, and Void of Superfluous Moiſtures, too much *Motion* hurteth: And it is an Errour in *Phyſitians*, to call too much upon *Exerciſe*. Likewiſe men ought to beware, that they uſe not *Exerciſe* and a *Spare Diet* both: but if much *Exerciſe*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exerciſe*. The *Benefits* that come of *Exerciſe* are, Firſt, that it ſendeth *Nouriſhment* into the Parts more forcibly. Secondly, that it helpeth to Excerne by *Sweat*, and ſo maketh the Parts aſſimilate the more perfectly. Thirdly, that it maketh the *Subſtance* of the *Body* more *Solid* and *Compact*; And ſo leſſe apt to be Conſumed and Depredated by the *Spirits*. The *Evills* that come of *Exerciſe*, are: Firſt, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth abſorbe likewiſe, and attenuate too much the Moiſture of the *Body*. Thirdly, that it maketh too great *Concuſſion*, (eſpecially if it be violent,) of the *Inward Parts*; which delight more in Reſt. But generally *Exerciſe*, if it be much, is no Friend to *Prolongation* of *Life*; Which is one Cauſe, why *Women* live longer then *Men*, becauſe they ſtirre leſſe.

Experiments Solitary, touching *Meats* that induce *Saciety*.
300

SOme *Food* we may uſe *long*, and *much*, without *Glutting*; As Bread, Fleſh that is not fat, or ranck, &c. Some other, (though pleaſant,) *Glutteth* ſooner; As Sweet Meats, Fat Meats, &c. The *Cauſe* is, for that *Appetite* conſiſteth in the Emptineſſe of the Mouth of the Stomack, Or poſſeſſing it with ſomewhat that is Aſtringent; And therefore Cold and Dry. But things that are *Sweet* and *Fat*, are more Filling: And doe ſwimme and hang more about the Mouth of the Stomack; And goe not downe ſo ſpeedily: And again turn ſooner to *Choler*, which is hot, and ever abateth the Appetite. We ſee alſo, that another *Cauſe* of *Saciety*, is an *Over-Cuſtome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the ſame be continually taken, induce *Loathing*. To give the reaſon of the *Diſtaſte* of *Saciety*, and of the *Pleaſure* in *Novelty*; and to diſtinguiſh not onely in Meats and Drinks, but alſo in Motions, Loves, Company, Delights, Studies, what they be that *Cuſtome* maketh more greatfull; And what more tedious; were a large Field. But for *Meats*, the Cauſe is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a Reliſh by former uſe. And (generally) it is a Rule, that whatſoever is ſomewhat Ingrate at firſt, is made Gratefull by *Cuſtome*; But whatſoever is too Pleaſing at firſt, groweth quickly to *ſatiate*.

NATVRALL HISTORIE.

IV. Century.

ACCELERATION of *Time*, in *Works* of *Nature*, may well bee esteemed *Inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the Enquiry of it: And for *Acceleration* of *Germination*, we will referre it over unto the place, where we shall handle the Subject of *Plants*, generally; And will now begin with other *Accelerations*.

Experiments in Consort touching the *Clarification* of *Liquours*, and the *Accelerating* thereof.

301 *Liquours* are (many of them,) at the first, thick and troubled; As *Must*, *Wort*, *Juyces* of *Fruits*, or *Hearbs* expressed, &c. And by *Time*, they settle, and Clarifie. But to make them cleare, before the *Time*, is a great work; For it is a Spur to Nature, and putteth her out of her pace: And besides, it is of good use, for making *Drinkes*, and *Sauces*, Potable, and Serviceable, speedily; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts*: For that ever representeth Bodies Cleare and Untroubled. The third, by the *Refining* the *Spirit it Selfe*, which thereby giveth to the *Liquour* more Splendour, and more Lustre.

302 First, for *Separation*: It is wrought by *Weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the severall Parts, either up, or down, which is a kind of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*; which Viscous Body (afterwards severed) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

Secondly,

303 Secondly, for the *Even Diſtribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we ſpeak not, becauſe it is that, we would anticipate and repreſent:) And it is wrought alſo, By *Mixture* of ſome other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better paſſe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewiſe By *Heat*; By *Motion*; And By *Mixture* of ſome *Body* which hath *Vertue to attenuate*. So therefore (having ſhewen the *Cauſes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take theſe *Inſtances*, and *Trials*.

305 It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the ſooner: For the *Lees*, though they keep the *Drink* in Heart, and make it laſting; yet withal they caſt up ſome Spiſſitude: And this *Inſtance* is to be referred to *Separation*.

306 On the other ſide, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will work; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Veſſel of *New Beere*; And take another Veſſel of *New Beere*, and Rack the one Veſſel from the *Lees*, and powre the *Lees* of the Racked Veſſel into the unracked Veſſel, and ſee the Effect: This *Inſtance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in ſome Quantity of *Stale Beere* into it, and ſee whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Groſſer Parts, whereby they may fall down into *Lees*. And this *Inſtance* again is referred to *Separation*.

308 The longer *Malt*, or *Hearbs*, or the like, are Infuſed in *Liquour*, the more thick and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*; the clearer it is. The reaſon is plaine, becauſe in *Infuſion*, the longer it is, the greater is the Part of the Groſſe Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or ſettleth at the Bottome. And therefore the moſt Exact Way to *Clarifie* is; Firſt to *Infuſe*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Malt* firſt infuſed in the *Liquour*, and is afterwards boiled with the Hop. This alſo is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almoſt to the very Neck: Let the Bottle be well ſtopped, leſt it fly out: And continue it, renewing the *Embers* every day, by the ſpace of Ten Dayes; and then compare it with another Bottle of the ſame *Beer* ſet by. Take alſo Lime both *Quenched*, and *Vnquenched*, and ſet the Bottles in them, *ut ſuprà*. This *Inſtance* is referred, both to the *Even Diſtribution*, and alſo to the *Refining* of the *Spirits* by *Heat*.

310 Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheel-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leave ſome Aire; For if the *Liquour* come cloſe to the Stopple, it cannot play, nor flower: And when you have ſhaken them well, either way, poure the *Drink* into another Bottle, Stopped cloſe, after the uſuall manner; For if it ſtay with much Aire in it, the *Drink* will pall; neither will it ſettle ſo perfectly in all the Parts. Let it ſtand ſome 24 houres: Then take it, and put it again into a *Bottle* with *Aire*, *ut ſuprà*: And thence into a *Bottle Stopped*, *ut ſuprà*: And ſo repeat the ſame *Operation* for ſeven dayes. Note that in the Emptying of one Bottle into another, you muſt doe it ſwiftly, leſt the *Drink* pall. It were good alſo, to try it in a *Bottle* with a little Aire below the Neck, without Emptying. This *Inſtance* is referred to the *Even Diſtribution* and *Refining* of the *Spirits* by *Motion*.

As

311 As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*,) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New Beere*, and ſtirred with it: For it may be that the Groſſer Part of the *Beere* will cleave to the *Milke*: The Doubt is, whether the *Milke* will ſever well againe; which is ſoone tried. And it is uſuall in *Clarifying Ippocraſſe* to put in *Milke*; Which after ſevereth and carrieth with it the *Groſſer Parts* of the *Ippocraſſe*, as hath been ſaid elſewhere. Alſo for the better *Clarification* by *Percolation*, when they tun *New Beere*, they uſe to let it paſſe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

Experiments in Conſort, touching *Maturation*, and the *Accelerating* thereof. And firſt touching the *Maturation* and *Quickning* of *Drinks*. And next touching the *Maturation* of *Fruits*.

The *Accelerating* of *Maturation* we will now enquire of. And of *Maturation* it ſelfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impoſtumes*, and *Ulcers*. This laſt we referre to another Place, where we ſhall handle *Experiments Medicinall*. There be alſo other *Maturations*, as of *Metals*, *&c.* whereof we will ſpeak as Occaſion ſerveth. But we will begin with that of *Drinkes*, becauſe it hath ſuch Affinity with the *Clarification* of *Liquours*.

312 For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digeſt more perfectly the Groſſer Parts: And it is effected partly, by the ſame meanes, that *Clarification* is, (whereof we ſpake before;) But then note, that an Extreme *Clarification* doth ſpread the *Spirits* ſo Smooth, as they become Dull, and the *Drink* dead, which ought to have a little Flouring. And therefore all your Clear *Amber Drink* is flat.

313 We ſee the *Degrees* of *Maturation* of *Drinks*; In *Muſt*; In *Wine*, as it is drunk; And in *Vinegar*. Whereof *Muſt* hath not the *Spirits* well Congregated; *Wine* hath them well united; ſo as they make the Parts ſomewhat more Oylie: *Vinegar* hath them Congregated, but more Jejune, and in ſmaller Quantity; The greateſt and fineſt Spirit and Part being exhaled: For we ſee *Vinegar* is made by ſetting the Veſſell of *Wine* againſt the hot Sunne. And therefore *Vinegar* will not burne; For that much of the Finer Parts is exhaled.

314 The *Refreſhing* and *Quickning* of *Drink* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So we ſee that *Open Weather* relaxeth the *Spirit*, and maketh it more lively in *Motion*. We ſee alſo *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (ſo that it ſpirteth when the Stopple is taken forth) maketh the *Drink* more quick and windy. A *Pan* of *Coales* in the *Cellar* doth likewiſe good, and maketh the *Drink* work againe. *New Drink* put to *Drink* that is *Dead*, provoketh it to work againe: Nay, which is more, (as ſome affirme,) *A Brewing of New Beere*, ſet by *Old Beere*, maketh it work again. It were good alſo to *Enforce* the *Spirits* by ſome *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, *&c.* We ſee *Creame* is *Matured*, and made to riſe more ſpeedily, by Putting in *Cold Water*; which, as it ſeemeth, getteth downe the *Whey*.

315 It is tried, that the *Burying* of *Bottles of Drink* well ſtopped, either in *dry Earth*, a good depth; Or in the *Bottom* of a *Well within Water*; And beſt of all the *Hanging* of them in a *deep Well* ſomewhat *above the Water*, for ſome fortnights ſpace, is an excellent *Meanes* of making *Drink* freſh, and quick

quick: for the *Cold* doth not cauſe any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the reſt that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the Parts of the *Liquour* perfectly.

316 As for the *Maturation of Fruits*; It is wrought by the *Calling forth of the Spirits of the Body outward*, and ſo *Spreading* them more *ſmoothly*: And likewiſe by *Digeſting*, in ſome degree, *the Groſſer Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalk*; In *Lime*; Covered over with *Onions*; Covered over with *Crabs*; Cloſed up in *Wax*; Shut in a *Box*, *&c.* There was alſo an *Apple* hanged up in *Smoak*: Of all which the *Experiment* ſorted in this Manner.

318 After a Moneths Space, the *Apple* Encloſed in *Wax*, was as Greene and Freſh as at the firſt Putting in, and the *Kernells* continued White. The *Cauſe* is, for that all *Excluſion* of *Open Aire*, (which is ever Predatory) maintaineth the Body in his firſt Freſhneſſe, and Moiſture: But the Inconvenience is, that it taſteth a little of the *Wax*: Which, I ſuppoſe, in a *Pomgranate*, or ſome ſuch thick coated *Fruit*, it would not doe.

319 The *Apple* Hanged in the *ſmoak*, turned like an Old Mellow *Apple* Wrinkled, Dry, Soft, Sweet, Yellow within. The *Cauſe* is, for that ſuch a degree of *Heat*, which doth neither Melt, nor Scorch, (for we ſee that in a greater *Heat*, a *Roaſt Apple* Softneth and Melteth, And *Pigs feet*, made of Quarters of *Wardens*; ſcortch and have a skin of Cole) doth Mellow, and not Adure: The *Smoak* alſo maketh the *Apple* (as it were) ſprinkled with *Soot*, which helpeth to *Mature*. We ſee that in *Drying* of *Peares*, and *Prunes*, in the Oven, and Removing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intenſe degree of *Heat*.

320 The *Apples* covered in the *Lime* and *Aſhes*, were well *Matured*, As appeared both in their Yellowneſſe, and Sweetneſſe. The *Cauſe* is, for that that *Degree of Heat* which is in *Lime* and *Aſhes*, (being a ſmoothering *Heat*) is of all the reſt moſt Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the Taſte of thoſe *Apples* was good; And therefore it is the *Experiment* fitteſt for Uſe.

321 The *Apples Covered* with *Crabs*, and *Onions*, were likewiſe well *Matured*. The Cauſe is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and ſpread them equally thorowout the *Body*; which taketh away Hardneſſe. So we ſee one *Apple* ripeneth againſt another. And therefore in making of *Cider*, they turn the *Apples* firſt upon a heape. So one *Cluſter* of *Grapes*, that toucheth another whileſt it groweth, ripeneth faſter; *Botrus contra Botrum citius matureſcit.*

322 The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not ſo much as the Other; But the *Apple* in the *Straw* more. The *Cauſe* is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet Cloſe and Smoothering, and which drieth not.

323 The *Apple* in the *Cloſe Box*, was ripened alſo: The *Cauſe* is, for that all Aire, kept cloſe, hath a degree of *Warmth*: As we ſee in *Wool*, *Fur*, *Pluſh*, *&c.*

Note that all theſe were Compared with another Apple, *of the ſame kind, that lay of it Selfe: And in Compariſon of that, were more Sweet, and more Yellow, and ſo Appeared to be more Ripe.*

324 Take an *Apple*, or *Peare*, or other like *Fruit*, and *Rowle* it upon a Table hard: We ſee in Common Experience, that the *Rowling* doth Soften and Sweeten

Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Vnequall Distribution* of the *Spirits* maketh the Harrishnesse: But this Hard *Rowling* is between *Concoction*, and a *Simple Maturation*; Therefore, if you should *Rowle* them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would *mature* more finely, and like unto the *Naturall Maturation*.

Take an *Apple*, and cut out a Peece of the Top, and cover it, to see whether that *Solution of Continuity* will not hasten a *Maturation*: We see that where a *Waspe*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily. 325

Take an *Apple*, &c. and prick it with a *Pin* full of *Holes*, not deep, and smear it a little with *Sack*, or *Cinnamon Water*, or *Spirit of wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it. 326

In these Trialls *also*, *as was used in the first*, *set another of the same* Fruits *by*, *to Compare them*: *And try them*, *by their* Yellownesse, *and by their* Sweetnesse.

Experiments Solitary touching the *Making* of *Gold*.

The World hath been much abused by the Opinion of *Making of Gold*: The *Work* it selfe I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of Errour and Imposture; And in the Theory, full of unsound Imaginations. For to say, that *Nature* hath an Intention to make all Metals *Gold*: And that, if she were delivered from Impediments, shee would performe her owne work: And that, if the Crudities, Impurities, and Leprosities of *Metals* were cured, they would become *Gold*: And that a little *Quantity* of the *Medicine*, in the Work of *Projection*, will turne a Sea of the *Baser Metall* into *Gold*, by *Multiplying*: All these are but dreames: And so are many other Grounds of *Alchymy*. And to help the Matter, the *Alchymists* call in likewise many Vanities, out of *Astrology*: *Naturall Magick*: Superstitious Interpretations of *Scriptures*: Auricular *Traditions*: Faigned Testimonies of *Ancient Authors*; And the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the World some amends. But we, when we shall come to handle the *Version* and *Transmutation* of *Bodies*: And the *Experiments* concerning *Metalls*, and *Mineralls*: will lay open the true Wayes and Passages of *Nature*, which may lead to this great Effect. And we commend the wit of the *Chineses*, who despaire of Making of *Gold*, but are Mad upon the Making of *Silver*: For certaine it is, that it is more difficult to make *Gold*, (which is the most Ponderous and Materiate amongst *Metalls*) of other *Metalls*, lesse Ponderous, and lesse Materiate; than (*vice versâ*) to make *Silver* of *Lead*, or *Quick-Silver*: Both which are more Ponderous than *Silver*: So that they need rather a further

ther Degree of *Fixation*, than any *Condenſation*. In the meane time, by Occaſion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby turning ſome of them into *Gold*: For we conceive indeed, that a perfect good *Concoction*, or *Diſgeſtion*, or *Maturation* of ſome *Metalls*, will produce *Gold*. And here wee call to mind, that we knew a *Dutch-man*, that had wrought himſelfe into the beleefe of a great Perſon, by undertaking that he could make *Gold*: Whoſe diſcourſe was, that *Gold* might be made; But that the *Alchymiſts* Over-fired the Work: For (he ſaid) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lamp, that ſhould carry a Temperate and Equall Heat: And that it was the Work of many Monthes. The Device of the Lamp was folly; But the Over-firing now uſed; And the Equall Heat to be required; And the making it a Work of ſome good Time; are no ill Diſcourſes.

We reſort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The Firſt is, that there be *uſed a Temperate Heat*; For they are ever *Temperate Heats* that *Diſgeſt*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits* and *Liquours*, which will not work at all upon *Metalls*. The Second is, that the *Spirit of the Metall be quickned*, and the *Tangible Parts opened*: For without thoſe two Operations, the *Spirit* of the *Metall*, wrought upon, will not be able to diſgeſt the parts. The Third is, that the *Spirits doe ſpread themſelves Even*, and *move not ſubſultorily*; For that will make the Parts Cloſe, and Pliant. And this requireth a Heat, that doth not riſe and fall, but continue as *Equall* as may be. The Fourth is, that *no Part of the Spirit be emitted, but detained*. For if there be *Emiſſion* of *Spirit*, the Body of the *Metall* will be Hard, and Churliſh. And this will be performed, partly by the Temper of the Fire: And partly by the cloſeneſſe of the Veſſell. The Fift is, that there bee *Choice made of the likelieſt and beſt prepared Metall, for the Verſion*: For that will facilitate the Work. The Sixth is, that you give *Time enough for the Work*: Not to prolong Hopes (as the Alchymiſts doe:) but indeed to give *Nature* a convenient Space to work in. Theſe Principles are moſt certaine, and true:

We

We will now derive a direction of *Trial* out of them, Which may (perhaps) by further Meditation, be improved,

327 Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such as may keep the *Metall perpetually Moulten*, and no more; For that above all importeth to the Work. For the Materiall, take *Silver*, which is the *Metall* that in Nature Symbolizeth most with *Gold*; Put in also, with the *Silver*, a Tenth Part of *Quick-Silver*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space of Sixe Moneths*, at the least. I wish also, that there be, at sometimes, an Injection of some *Oyled* Substance; Such as they use in the Recovering of *Gold*, which by Vexing with Separations hath been made Churlish: And this is, to lay the Parts more Close and Smooth, which is the Maine Work. For *Gold* (as we see) is the Closest (and therefore the Heaviest) of *Metals*: And is likewise the most Flexible, and Tensible. Note, that to thinke to make *Gold* of *Quick-silver*, because it is the heaviest, is a Thing not to be hoped; For *Quick-silver* will not endure the Mannage of the *Fire*. Next to *Silver*, I thinke *Copper* were fittest to bee the *Materiall*.

Experiment Solitary, touching the *Nature* of *Gold*.

328 *Gold* hath these *Natures*: *Greatnesse of Weight*; *Closeness of Parts*; *Fixation*; *Pliantnesse*, or *Softnesse*; *Immunity from Rust*; *Colour* or *Tincture of Yellow*. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the Severall *Natures* before rehearsed, and the *Axiomes* concerning the same. For if a man can make a *Metall*, that hath all these *Properties*, Let men dispute, whether it be *Gold*, or no?

Experiments in Consort, touching the *Enducing* and *Accelerating* of *Putrefaction*.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Universall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which ever are Unquiet to *Get forth*, and *Congregate* with the *Aire*, and to enjoy the *Sunnebeames*. The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If the *Spirits* be detained within the Body, and move more violently, there followeth *Colliquation*; As in *Metals*, &c. If more Mildely, there followeth *Disgestion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* be not meerly Detained, but Protrude a little, and that Motion be Confused, and inordinate, there followeth *Putrefaction*; Which ever dissolveth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metals*. But if that Motion be in a certain Order, there followeth *Vivification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures Perfect*. But if the *Spirits* issue out of

the Body, there followeth *Deſiccation, Induration, Conſumption*, &c. As in *Bricke*, evaporation of *Bodies Liquid*, &c.

329 The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; Firſt by *Adding ſome Crude or Watry Moiſture*; As in Wetting of any Fleſh, Fruit, Wood, with *Water*, &c. For contrariwiſe *Unctuous* and *Oily Subſtances* preſerve.

330 The Second is by *Invitation* or *Excitation*; As when a *Rotten Apple* lyeth cloſe to another *Apple* that is ſound: Or when *Dung* (which is a Subſtance already Putrified) is added to other Bodies. And this is alſo notably ſeene in *Church-yards*, where they bury much; Where the Earth will conſume the *Corps*, in farre ſhorter time, than other Earth will.

331 The Third is, by *Cloſeneſſe*, and *Stopping*, which *detaineth* the *Spirits*, in *Priſon*, more than they would; And thereby irritateth them to ſeeke Iſſue; As in Corne, and Cloaths, which waxe Muſty; and therefore Open Aire, (which they call *Aër perflabilis*) doth preſerve: And this doth appeare more evidently in *Agues*, which come (moſt of them,) of *Obſtructions*, and *Penning* the *Humours*, which thereupon *Putrifie*.

332 The Fourth is, by *Solution of Continuity*; As we ſee an Apple will rot ſooner, if it be Cut or Pierced; And ſo will Wood, &c. And ſo the Fleſh of Creatures alive, where they have received any Wound.

333 The Fifth is, either by the *Exhaling*, or by the *Driving back* of the *Principall Spirits*, which preſerve the Conſiſtence of the *Body*; So that when their Government is diſſolved, every *Part* returneth to his Nature, or Homogeny. And this appeareth in *Urine*, and *Blood*, when they coole, and thereby break; It appeareth alſo in the *Gangrene*, or *Mortification* of *Fleſh*, either by *Opiates*, or by *Intenſe Colds*. I conceive alſo the ſame Effect is in *Peſtilences*, for that the *Malignity* of the *Infecting Vapour*, daunteth the *Principall Spirits*, and maketh them flie, and leave their *Regiment*; And then the *Humours*, *Fleſh*, and *Secondary Spirits*, doe diſſolve, and breake, as in an *Anarchy*.

334 The Sixth is, when a *Forraine Spirit, Stronger and more Eager than the Spirit of the Body, entreth the Body*; As in the Stinging of Serpents. And this is the *Cauſe* (generally) that upon all *Poyſons* followeth *Swelling*: And we ſee *Swelling* followeth alſo, when the *Spirits* of the *Body* it ſelf, Congregate too much; As upon *Blowes*, and *Bruiſes*; Or when they are *Pent in too much*, as in *Swelling* upon *Cold*. And we ſee alſo, that the *Spirits* coming of *Putrefaction* of *Humours* in *Agues*, &c. Which may be counted as *Forraine Spirits*; though they be bred within the Body, doe Extinguiſh and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seventh is, by ſuch a *Weak Degree of Heat, as ſetteth the Spirits in a little Motion, but is not able, either to diſgeſt the Parts, or to Iſſue the Spirits*; As is ſeene in Fleſh kept in a Room that is not Coole; Whereas in a Coole and Wet Larder it will keep longer. And we ſee, that *Vivification* (whereof *Putrefaction* is the *Baſtard Brother*,) is effected by ſuch Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336 The Eight is, by the *Releaſing of the Spirits*; which before were cloſe kept by the Solidneſſe of their Coverture, and thereby their Appetite of Iſſuing checked; As in the *Artificiall Ruſts* induced by ſtrong Waters, in *Iron*, *Lead*, &c. And therefore *Wetting* haſteneth *Ruſt*, or *Putrefaction* of any thing, becauſe it ſoftneth the Cruſt, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and Dry*; As we ſee in the Mouldring of Earth in Froſts, and Sunne; And in the more haſty Rotting of Wood, that is ſometimes wet, ſometimes dry.

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The Tenth is, by *Time, and the Work and Procedure of the Spirits themselves*; which cannot keep their Station; Especially if they be left to themselves, And there be not Agitation or Locall Motion. As we see in Corn not stirred; And Mens Bodies not exercised. 338

All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Orenges*, and *Limmons*; which *Moulds* afterwards turn into Wormes, or more odious *Putrefactions*: And therefore (commonly) prove to be of ill Odour. And if the Body be Liquid, and not apt to putrifie totally, it will cast up a *Mother* in the Top; As the *Mothers* of *Distilled Waters*. 339

Mosse is a Kinde of *Mould*, of the Earth and Trees. But it may be better sorted as a *Rudiment* of *Germination*; To which we referre it. 340

Experiments in Consort, touching *Prohibiting* and *Preventing Putrefaction*.

It is an *Enquirie* of Excellent use, to Enquire of the *Meanes* of *Preventing* or *Staying* of *Putrefaction*; For therein consisteth the *Meanes* of *Conservation* of *Bodies*; For *Bodies* have two Kindes of *Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions* of the *Bodies* of *Men*, and *Living Creatures* (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Vlcers both Inwards and outwards) they are a great *Part of Physicke*, and *Surgery*; And therefore we will reserve the *Enquiry* of them to the proper Place, where we shall handle *Medicinal Experiments* of all Sorts. Of the rest we will now Enter into an Enquiry: wherin much light may be taken, from that which hath been said, of the *Meanes* to *Induce* or *Accelerate Putrefaction*: For the Removing that, which caused *Putrefaction*, doth Prevent and Avoid *Putrefaction*.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so we see that Meat and Drink will last longer, Unputrified, or Unsowred, in Winter, than in Summer: And we see that Flowers, and Fruits; put in Conservatories of Snow, keep fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*. 341

The Second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibite *Putrefaction*: And by the same reason of *Astringency*, some small Quantity of Oile of Vitrioll, will keep Fresh Water long from *Putrifying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same Meanes that Cold doth. 342

The Third is, the Excluding of the *Aire*; And again, the *Exposing to the Aire*: For these Contraries, (as it commeth often to passe,) work the same Effect, according to the Nature of the Subject-Matter. So we see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners under Ground* keepe Corne longer than those above Ground; And that *Fruit closed in Wax* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keep more fresh: And *Liquors*, *Drinks*, and *Juyces*, with a little *Oyle* cast on the Top, keep fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed Moaths, and Mould; and the Diversitie is, that in *Bodies* 343

that need *Detention* of *Spirits*, the *Excluſion of the Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emiſſion* of *Spirits* to diſcharge ſome of the Superfluous Moiſture, it doth hurt, for they require *Airing*.

344 The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Reſt*; For the Subtill *Motion*, which *Putrefaction* requireth, is diſturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As we ſee that Turning over of Corne in a Garner; Or Letting it runne like an Houre-glaſſe, from an upper Room into a Lower, doth keep it Sweet: And Running Waters putrifie not: And in Mens Bodies, Exerciſe hindreth *Putrefaction*; And contrariwiſe *Reſt*, and Want of *Motion*, or Stoppings; (whereby the Runne of Humours, or the Motion of Perſpiration, is ſtayed,) further *Putrefaction*; As we partly touched a little before.

345 The Fifth is, the *Breathing forth of the Adventitious Moiſture in Bodies*, For as *Wetting* doth haſten *Putrefaction*; So *Convenient Drying*, (whereby the more *Radicall Moiſture* is onely kept in,) putteth back *Putrefaction*: So we ſee that *Herbs*, and *Flowers*, if they be dried in the Shade; or dried in the hot Sunne, for a ſmall time, keepe beſt. For the *Emiſſion* of the *Looſe* and *Adventitious Moiſture*, doth betray the *Radicall Moiſture*; And carryeth it out for Company.

346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a Strong *Spirit* likewiſe preſerveth, and a Weake or Faint *Spirit* diſpoſeth to *Corruption*. So we finde that Salt water corrupteth not ſo ſoon as Freſh: And Salting of Oiſters, and Powdring of Meat, keepeth them from *Putrefaction*. It would be tried alſo, whether *Chalke* put into *Water*, or *Drinke*, doth not preſerve it from *Putrefying*, or ſpeedy Souring. So we ſee that *Strong Beere* will laſt longer than Small, And all Things, that are Hot and Aromaticall, doe helpe to Preſerve Liquours, or Powders, &c. Which they doe, as well by Strengthening the *Spirits*, as by Soaking out the looſe *Moiſture*.

347 The Seventh is, *Separation of the Cruder Parts*, and thereby *making the Body more Equall*; for all unperfect Mixture is apt to *Putrefie*; And Watry Subſtances are more apt to *Putrefie*, than Oyly. So we ſee Diſtilled Waters will laſt longer than Raw waters; And Things that have paſſed the Fire, doe laſt longer than thoſe that have not paſſed the Fire; as Dried Peares, &c.

348 The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Looſe and Watry Moiſture*; Not onely for the Reaſon before given, that it provoketh the *Radicall Moiſture* to come forth with it; But becauſe being detained in the Body, the *Putrefaction* taking hold of it, infecteth the reſt: As we ſee in the *Embalming of dead Bodies*: And the ſame Reaſon is of *Preſerving Herbs*, or *Fruits*, or *Flowers*, in *Brannie*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily*, or *Sweet*: For ſuch *Bodies* are leſt apt to *Putrefie*; the *Aire* working little upon them; And they not putrefying preſerve the reſt. And therefore we ſee *Syrrups*, and *Ointments*, will laſt longer, than *Juyces*.

350 The Tenth is, the *Commixture of ſomewhat that is Drie*; For *Putrefaction* beginneth firſt from the *Spirits*; And then from the *Moiſture*: And that that is dry is unapt to putrefie: And therefore Smoake preſerveth Fleſh; As we ſee in Bacon, and Neats-Tongues, and Martlemas Beefe, &c.

The

The Opinion of ſome of the *Ancients*, that *Blowne Aires* doe preſerve Bodies, longer than other *Aires*, ſeemeth to Me Probable; For that the *Blowne Aires*, being Over-charged and Compreſſed, will hardly receive the Exhaling of any Thing, but rather repulſe it. It was tried in a *Blowne Bladder*, whereinto Fleſh was put, and likewiſe a Flower, and it ſorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather further *Putrefaction*: The way were therefore, to blow ſtrongly, with a Paire of Bellowes, into a Hogſhead, putting into the Hogſhead (before) that which you would have preſerved; And in the inſtant that you withdraw the Bellowes, ſtop the Hole cloſe. 351

THe *Experiment* of *Wood* that *Shineth* in the *Darke*, we have diligently driven, and purſued: The rather, for that of all Things, that give Light here below, it is the moſt Durable; And hath leaſt Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* ſhineth only while it is in Scraping; And *Salt-water* while it is in Daſhing; *Glo-wormes* have their Shining while they live, or a little after; Onely *Scales* of *Fiſhes* (Putrified) ſeeme to be of the ſame Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* ſorted thus. 1. The *Shining* is in ſome Peeces more *Bright*, in ſome more *Dimme*; but the moſt *Bright* of all doth not attaine to the Light of a *Gloworme*. 2. The *Woods* that have been tried to ſhine, are chiefly *Sallow*, and *Willow*; Alſo the *Aſh*, and *Haſle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe ſhine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Daylight, is in ſome Peeces *White*, in ſome Peeces inclining to *Red*; Which in the Country they call the *White*, and *Red Carret*. 5. The Part that Shineth, is, (for the moſt Part) ſomewhat *Soft*, and *Moiſt* to feele to; But ſome was found to be *Firme* and *Hard*; So as it might be figured into a Croſſe, or into Beads, &c. But you muſt not look to have an Image, or the like, in any Thing that is Lightſome; For even a face in Iron red Hot will not be ſeen, the Light confounding the ſmall differences of Lightſome and Darkſome, which ſhew the figure. 6. There was the *Shining Part pared off*, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* began alſo to *Shine*, being laid abroad in the Dew; So as it ſeemeth the Putrefaction ſpreadeth. 7. There was other dead *Wood* of like kinde, that was *Laid abroad*, which *Shined* not at the firſt; But after a Nights lying abroad began to *Shine*. 8. There was other *Wood*, that did *Firſt Shine*; And being laid drie in the Houſe, within five or ſix dayes, *Loſt* the *Shining*; And laid abroad again, *Recovered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seven night, loſt their Shining; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring of Holes*, in that kinde of Wood, and then laying it abroad, ſeemeth to conduce to make it *Shine*: The *Cauſe* is, for that all *Solution* of *Continuity* doth help on *Putrefaction*, as was touched before. 11. No *Wood* hath been yet tried to *Shine*, that was cut *downe alive*, but ſuch as was *Rooted*, both in Stocke, and Root, while it grew. 12. Part of the *Wood* that *Shined*, was *ſteeped* in *Oyle*, and retained the *Shining* a Fortnight. 13. The like ſucceeded in ſome *Steeped* in *Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* be *laid abroad every Night*, and *taken in* and *Sprinkled* with *Water* in the *Day*, is not yet tryed. 15. Triall was made of *laying it abroad in Froſtie weather*, which hurt it not. 16. There was a great *Peece* of a *Root*, which did ſhine, and the *Shining Part* was *Cut off*, till no more Shined; Experiment Solitary touching *Wood Shining* in the *Dark*. 352

Shined; Yet after two Nights, though it were kept in a drie Room, it got a *Shining*.

Experiment Solitary, touching the *Acceleration* of *Birth*. 353

THe *Bringing forth* of *Living Creatures* may be *Accelerated* in two Reſpects: The one, if the *Embryon ripeneth* and perfecteth ſooner: The other, if there be ſome Cauſe from the *Mothers Body*, of *Expulſion* or Putting it downe: whereof the Former is good, and argueth Strength; The Latter is ill, and commeth by Accident or Diſeaſe. And therefore the Ancient *Obſervation* is true, that the *Childe borne in the Seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the moſt part) die. But the *Cauſe* aſſigned is Fabulous; Which is, that in the Eighth Moneth, ſhould be the returne of the Raigne of the *Planet Saturne*: which (as they ſay) is a *Planet* Maligne; whereas in the Seventh is the Raigne of the *Moone*, which is a Planet Propitious. But the true *Cauſe* is, for that where there is ſo great a Prevention of the Ordinary time, it is the *luſtineſſe* of the *Childe*; But when it is leſſe, it is ſome *indiſpoſition* of the *Mother*.

Experiment Solitary, touching the *Acceleration* of *Growth* and *Stature*. 354

TO *Accelerate Growth* or *Stature*, it muſt proceed; Either from the *Plenty* of the *Nouriſhment*; Or from the *Nature* of the *Nouriſhment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the firſt, *Exceſſe* of *Nouriſhment* is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Height. And you may take an Experiment from *Plants*, which, if they ſpread much, are ſeldome tall. As for the *Nature* of the *Nouriſhment*; Firſt, it may not be too *Drie*; And therefore Children in Dayrie Countries doe waxe more tall, than where they feed more upon Bread, and Fleſh. There is alſo a receiv ed Tale; That boyling of *Daiſie Roots* in *Milke* (which it is certaine are great Driers) will make *Dogs* little. But ſo much is true, that an *Over-Drie Nouriſhment* in Childhood putteth backe Stature. Secondly, the *Nouriſhment* muſt be of an *Opening Nature*; For that Attenuateth the Juyce, and furthereth the Motion of the Spirits, upwards. Neither is it without cauſe, that *Xenophon*, in the *Nouriture* of the *Perſian Children*, doth ſo much commend their Feeding upon *Cardamon*; which (he ſaith) made them grow better, and be of a more Active Habit. *Cardamon* is in Latine *Naſturtium*; And with us *Water-Creſſes*; Which, it is certaine, is an Herbe, that whileſt it is young, is Friendly to Life. As for the *Quickening* of *Naturall Heat*, it muſt be done chiefly with *Exerciſe*; And therefore (no doubt) much Going to Schoole, where they ſit ſo much, hindreth the *Growth* of *Children*; whereas Country-People, that goe not to Schoole, are commonly of better Stature. And againe, Men muſt beware how they give *Children*, any thing that is *Cold* in Operation; For even *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath been tryed, that a Whelpe, that hath been fed with *Nitre* in *Milke*, hath become very little, but extream lively: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the ſame Reaſon; For *Heat* is requiſite to Growth: But after a Man is come to his Middle Age, *Heat* conſumeth the *Spirits*; which the Coldneſſe of the *Spirit* of *Nitre* doth helpe to condenſe, and correct.

Experiments in Conſort, touching *Sulphur* and *Mercury*, two of *Paracelſus* Principles.

There bee two *Great Families* of *Things*; You may terme them by ſeverall Names; *Sulphureous* and *Mercureall*, which are the *Chymiſts* Words: (For as for their *Sal*, which is their Third Principle,

Principle, it is a Compound of the other two;) *Inflammable*, and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For wee see that in *Subterranies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*; In *Vegetables*, and *Living Creatures* there is *Water* and *Oile*: In the *Inferiour Order* of *Pneumaticals* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they bee unlike in the Primitive Differences of Matter, yet they seeme to have many Consents: For *Mercury* and *Sulphure* are principall Materials of *Metals*; *Water* and *Oyle*, are principall Materials of *Vegetables*, and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in Vulgar Opinion) is but *Aire Incensed*; And they both have Quickness of Motion, and Facilitie of Cession, much alike: And the *Interstellar Sky*, (though the Opinion be vain, that the *Starre* is the *Denser Part* of his *Orbe*,) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of greatest *Magnalia Naturæ*, to turne *Water* or *Watry Iuyce* into *Oile* or *Oily Iuyce*: Greater in Nature, than to turne *Silver*, or *Quick-Silver*, into *Gold*.

The Instances we have, wherein *Crude* and *Watry* Substance turneth into *Fat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water*; which mingled by the helpe of the Sunne, gather a Nitrous Fatnesse, more than either of them have severally; As we see, in that they put forth *Plants*, which need both Juyces. 355

The Second is in the *Assimulation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures*; Whereof *Plants* turne the Juyce of meer *Water* and *Earth*, into a great deale of *Oily Matter*: *Living Creatures*, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they Assimilate also in a Measure their *Drink* of *Water*, &c. But these two Wayes of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimulation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time. 356

The Third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which have a kinde of *Fatness*, or *Oyle*. 357

The Fourth is in the *Dulcoration* of some *Metals*; As *Saccharum Saturni*, &c. 358

The Intension of *Version* of *Water* into a more *Oily Substance*, is by *Digestion*; For *Oile* is almost Nothing else but *Water Digested*; And this *Digestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by Provocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily*, or *Digested*; For they will somewhat Communicate their Nature with the rest. *Digestion* also is strongly effected by direct *Assimulation*, of *Bodies Crude* into *Bodies Digested*; As in *Plants*, and *Living Creatures*, whose Nourishment is farre more Crude than their Bodies: 359

dies: But this *Diſgeſtion* is by a great Compaſſe, as hath beene ſaid. As for the more full Handling of theſe two Principles, whereof this is but a Taſte; (the Enquiry of which is one of the Profoundeſt Enquiries of Nature,) We leave it to the *Title* of *Verſion* of *Bodies*; And likewiſe to the *Title* of the *Firſt Congregations* of *Matter*; Which like a Generall Aſſembly of Eſtates, doth give Law to all *Bodies*.

Experiment Solitarie, touching *Chameleons*. 360

A *Chamelion* is a Creature about the Bigneſſe of an Ordinary *Lizard*; His Head unproportionably bigge; His eyes great: He moveth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skinne ſpotted with little Tumours, leſſe Eminent nearer the Belly; His Taile ſlender, and long: On each Foot he hath five Fingers; three on the Outſide, and two on the Inſide; His Tongue of a marvellous Length in reſpect of his Body, and hollow at the end; which he will launch out to prey upon *Flies*. Of Colour Green and of a dusky Yellow, brighter and whiter towards the Belly; Yet ſpotted with Blew, White, and Red. If he be laid upon Green, the Green predominateth; If upon Yellow, the Yellow; Not ſo if he be laid upon Blew, or Red, or White; Only the Greene Spots receive a more Orient Luſtre; Laid upon Blacke, hee looketh all Blacke, though not without a Mixture of Greene. He feedeth not only upon Aire, (though that be his principall Suſtenance;) For ſometimes he taketh *Flies*, as was ſaid; Yet ſome that have kept *Chameleons* a whole yeare together, could never perceive that ever they fed upon any Thing elſe but Aire; And might obſerve their Bellies to ſwell after they had exhauſted the Aire, and cloſed their Jawes; Which they open commonly againſt the Rayes of the Sunne. They have a fooliſh Tradition in *Magick*, that if a *Chameleon* be burnt upon the Top of an Houſe, it will raiſe a Tempeſt, Suppoſing (according to their vain Dreams of *Sympathies*) becauſe he nouriſheth with Aire, his Body ſhould have great vertue to make Impreſſion upou the Aire.

Experiment Solitary touching *Subterrany Fires*. 361

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that thoſe *Flames* are cleare, and caſt not forth ſuch Smoake, and Aſhes, and Pummice, as *Mountaine Flames* doe. The Reaſon (no doubt) is, becauſe the *Flame* is not pent, as it is in *Mountaines*, and *Earthquakes* which caſt *Flame*. There be alſo ſome *Blinde Fires*, under *Stone*, which flame not out, but *Oile* being powred upon them, they flame out. The Cauſe whereof is, for that it ſeemeth, the *Fire* is ſo choaked, as not able to remove the Stone, it is *Heat* rather than *Flame*; Which nevertheleſſe is ſufficient to Enflame the *Oile*.

Experiment Solitary touching *Nitre*. 362

IT is reported, that in ſome *Lakes*, the *Water* is ſo *Nitrous*, as if Foule Cloaths be put into it, it ſcoureth them of it ſelfe: And if they ſtay any whit long, they moulder away. And the ſcouring Vertue of *Nitre* is the more to be noted, becauſe it is a *Body Cold*; And we ſee *Warme Water* ſcoureth better than *Cold*. But the *Cauſe* is, for that it hath a Subtill Spirit, which ſevereth and divideth any thing that is foule, and Viſcous, and ſticketh upon a Body.

Experiment Solitary touching *Congealing* of *Aire*. 363

TAke a *Bladder*, the greateſt you can get; Fill it full of Winde, and tye it about the Neck with a Silke thred waxed; And upon that likewiſe Wax very cloſe; So that when the Neck of the *Bladder* drieth, no *Aire* may poſſibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Vault*, or in a *Conſervitory* of *Snow*, the *Snow* being made hollow about the *Bladder*;

Bladder; And after ſome Fortnights diſtance, ſee whether the *Bladder* be ſhrunk: For if it be, then it is plain, that the *Coldneſſe* of the *Earth* or *Snow*, hath Condenſed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Conſequence.

IT is a Report of ſome good credit, that in *Deepe Caves*, there are *Penſile Chryſtall*, and *Degrees* of *Chryſtall* that drop from above; And in ſome other, (though more rarely) that riſe from below. Which though it be chiefly the Worke of Cold, yet it may be, that Water, that paſſeth thorow the Earth, gathereth a Nature more clammy, and fitter to Congeale, and becomes Solide, than Water of it ſelfe. Therefore Triall would bee made, to lay a Heape of Earth, in great Froſts, upon a Hollow Veſſell, putting a Canvaſe between, that it falleth not in: And poure Water upon it, in ſuch Quantity as will be ſure to ſoake thorow; And ſee whether it will not make an harder Ice in the bottome of the Veſſell, and leſſe apt to diſſolve, than ordinarily. I ſuppoſe alſo, that if you make the Earth narrower at the bottome, than at the Top, in faſhion of a Sugar Loafe Reverſed, it will help the Experiment. For it will make the Ice, where it Iſſueth, leſſe in Bulk; And evermore Smalneſſe of Quantity is a Helpe to *Verſion*.

Experiment Solitary touching *Congealing* of *Water* into *Chryſtall*. 364

TAke *Damaske Roſes*, and pull them; Then drie them upon the Top of an Houſe, upon a Lead or Tarras, in the Hot Sun, in a clear day, between the Houres (onely) of twelve and two, or thereabouts. Then put them into a Sweet *Drie Earthen Bottle*, or a *Glaſſe* with narrow Mouthes, ſtuffing them cloſe together, but without Bruiſing: Stop the *Bottle*, or *Glaſſe*, cloſe, and theſe *Roſes* will retaine, not onely their Smell Perfect, but their Colour freſh, for a yeare at leaſt. Note, that Nothing doth ſo much deſtroy any Plant, or other body, either by *Putrefaction*, or *Arefaction*, as the *Adventitious Moiſture*, which hangeth looſe in the Body, if it be not drawn out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moiſture* along with it, when it ſelfe goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preſerve the Juyce of the Body. Note that theſe *Roſes*, when you take them from the *Drying* have little or no *Smell*, So that the *Smell* is a Second *Smell*, that iſſueth out of the *Flower* afterwards.

Experiment Solitary, touching *Preſerving* of *Roſe leaves* both in *Colour* and *Smell*. 365

THe *Continuance* of *Flame*, according unto the diverſity of the *Body Enflamed*, and other Circumſtances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almoſt) of a Momentany Laſting, yet it receiveth the More, and the Leſſe: we will firſt therefore ſpeake (at large) of *Bodies Enflamed*, wholly, and Immediately, without any *Wicke* to helpe the *Inflammation*. A Spoonfull of *Spirit* of *Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulſes. The ſame Quantity of *Spirit* of *Wine*, Mixed with the Sixth Part of a Spoonfull of *Nitre* burnt but to the ſpace of 94. Pulſes. Mixed with the like Quantity of *Bay-ſalt*, 83. Pulſes. Mixed with the like Quantity of *Gunpowder*, which diſſolved into a Blacke water, 110. Pulſes. A Cube, or Pellet of *Yellow Waxe*, was taken, as much as halfe the *Spirit* of *Wine*, and ſet in the Middeſt, and it burnt onely to the ſpace of 87. Pulſes. Mixed with the Sixth Part of a ſpoonfull of *Milke*, it burnt to the ſpace of 100. Pulſes; And the *Milke* was crudled. Mixed with the Sixth Part of a ſpoonfull of *Water*, it burnt to the ſpace of 86. Pulſes; With an *Equall Quantity* of *Water*, onely to the ſpace of 4. Pulſes. A ſmall *Pebble* was laid in the Middeſt, and the *Spirit* of *Wine* burnt to the ſpace of 94. Pulſes.

Experiments in Conſort, touching the *Continuance* of *Flame*. 366

Pulſes. A Peece of *Wood*, of the Bigneſſe of an Arrow, and about a Fingers length, was ſet up in the Middeſt, and the *Spirit* of *Wine* burnt to the ſpace of 94. Pulſes. So that the *Spirit of Wine Simple*, endured the longeſt; And the *Spirit* of *Wine* with the *Bay-ſalt*, and the *Equall Quantity* of *Water*, were the ſhorteſt.

367 Conſider wel, whether the more ſpeedy *Going forth of the Flame*, be cauſed, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Reſiſtance* of the *Body mixed*, and the *Averſion* thereof to take *Flame*: Which will appear by the Quantity of the *Spirit* of *Wine*, that remaineth after the Going out of the *Flame*. And it ſeemeth clearly to be the latter; For that the Mixture of Things leaſt apt to burne, is the Speedieſt in going out. And note, by the way, that *Spirit* of *Wine* burned, till it goe out of it ſelf, will burn no more; And taſteth nothing ſo hot in the Mouth as it did; No nor yet ſowre, (as if it were a degree towards *Vinegar*,) which *Burnt Wine doth*; but flat and dead.

368 Note, that in the *Experiment* of *Wax* aforeſaid, the *Wax* diſſolved in the burning, and yet did not incorporate it ſelf, with the *Spirit* of *Wine*, to produce on *Flame*; but whereſoever the *Wax* floated, the *Flame* forſook it, till at laſt it ſpread all over, and put the *Flame* quite out.

369 The *Experiments* of the *Mixtures* of the *Spirit* of *Wine enflamed*. are Things of diſcovery, and not of Uſe: But now we will ſpeak of the *Continuance* of *Flames*, ſuch as are uſed for *Candles*, *Lamps*, or *Tapers*; conſiſting of *Inflamable Matters*, and of a *Wieke* that provoketh *Inflamation*. And this importeth not onely Diſcovery, but alſo Uſe and Profit; For it is a great Saving in all ſuch Lights, if they can be made as faire and right as others, and yet laſt longer. *Wax Pure* made into a Candle, and *Wax Mixed* ſeverally into Candle ſtuffe, with the Particulars that follow; (viz. *Water*, *Aqua-vitæ*, *Milke*, *Bay-ſalt*, *Oyle*, *Butter*, *Nitre*, *Brimſtone*, *Saw-duſt*,) Every of theſe bearing a Sixth Part to the *Wax*; And every of theſe *Candles Mixed*, being of the ſame Weight and Wieke, with the *Wax Pure*, proved thus in the Burning, and Laſting. The Swifteſt in Conſuming was that with *Saw duſt*; Which firſt burned faire till ſome part of the *Candle* was conſumed, and the Duſt gathered about the Snaſte; But then it made the Snaſte big, and long, and to burn duskiſhly, and the *Candle* waſted in halfe the time of the *Wax Pure*. The next in Swiftneſſe, were the *Oyle*, and *Butter*, which conſumed, by a Fifth part, ſwifter than the *Pure Wax*. Then followed in Swiftneſſe the *Cleare Wax* it ſelfe. Then the *Bay-Salt*, which laſted about an Eighth part longer than the *Cleare Wax*. Then followed the *Aqua-vitæ*, which laſted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vitæ*, but the *Water* ſloweſt. And in theſe foure laſt, the *Wieke* would ſpit forth little Sparks. For the *Nitre*, it would not hold lighted above ſome Twelve Pulſes: But all the while it wonld ſpit out Portions of *Flame*, which afterwards would goe out into a vapour. For the *Brimſtone*, it would hold lighted, much about the ſame with the *Nitre*; But then after a little while, it would harden and cake about the Snaſte; So that the Mixture of *Bay-ſalt* with *Wax*, will winne an Eighth part of the time of laſting, and the *Water* a Fifth.

370 After the Severall *Materials* were tried, Triall was likewiſe made of ſeverall *Wiekes*; As of Ordinary *Cotton*; *Sowing Thred*; *Ruſh*; *Silke*; *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they came to the *Wax*, and then goe out: of the Other Three, the *Thred* conſumed faſter than the *Cotton*, by a Sixth part of Time: The *Cotton* next: Then the *Ruſh* conſumed

ſumed ſlower than the *Cotton*, by at leaſt a third part of time. For the Bigneſſe of the *Flame*, the *Cotton*, and *Thred*, caſt a *Flame* much alike; and the *Ruſh* much leſſe, and dimmer. *Quare*, whether *Wood*, and *Wickes* both, as in *Torches*, conſume faſter, than the *Wickes Simple*?

We have ſpoken of the Severall *Materials*, and the Severall *Wickes*: But to the *laſting* of the *Flame*, it importeth alſo; Not only what the *Materiall* is, but in the ſame *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Houſwives*, to make their *Candles* burne the longer, uſe to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and ſo they Conſume the ſlower: Inſomuch, as by this meanes, they will out-laſt other *Candles*, of the ſame ſtuffe, almoſt Halfe in Halfe. For *Bran* and *Flower* have a Vertue to Harden: So that both Age, and lying in the Bran, doth help to the Laſting. And we ſee that *Wax Candles* laſt longer than *Tallow Candles*, becauſe *Wax* is more firme, and hard. 371

The *Laſting* of *Flame* alſo dependeth upon the *eaſie Drawing* of the *Nouriſhment*; As we ſee in the *Court* of *England*, there is a Service which they call *All-night*; which is (as it were) a great Cake of wax, with the Wieke in the Middeſt; whereby it commeth to paſſe, that the Wieke fetcheth the Nouriſhment further off. We ſee alſo that *Lamps* laſt longer, becauſe the veſſell is farre broader, than the Bredth of a Taper, or Candle. 372

Take a *Turreted Lampe* of *Tinne*, made in the forme of a Squire; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* ſtandeth: Make only one Hole in it, at the End of the Returne furtheſt from the *Turret*. Reverſe it, and fill it full of *Oile*, by that Hole; And then ſet it upright againe; And put a Wieke in at the Hole; And lighten it: You ſhall finde, that it will burne ſlow, and a long time: Which is cauſed, (as was ſaid laſt before,) for that the *Flame* fetcheth the *Nouriſhment afarre off*. You ſhall finde alſo, that as the *Oile* waſteth, and deſcendeth, ſo the Top of the *Turret*, by little and little, filleth with Aire; which is cauſed by the Rarefaction of the *Oile* by the Heat. It were worthy the Obſervation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almoſt conſumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good alſo to have the *Lampe* made, not of *Tinne*, but of *Glaſſe*, that you may ſee how the Vapour, or Aire gathereth, by degrees, in the Top. 373

A Fourth Point, that importeth the *laſting* of the *Flame*, is the *Cloſeneſs* of the *Aire*, wherein the *Flame* burneth. We ſee, that if *Wind* bloweth upon a *Candle*, it waſteth apace. We ſee alſo, it laſteth longer in a *Lanthorne*, than at *large*. And there are Traditions of *Lamps*, and *Candles*, that have burnt a very long time, in *Caves*, and *Tombes*. 374

A Fifth Point, that importeth the *Laſting* of the *Flame*, is the *Nature* of the *Aire*, where the *Flame* burneth; whether it be Hot or Cold; Moiſt or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire ſcorcheth in Froſtie weather;) And ſo furthereth the *Conſumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burne more mildly, and ſo helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Moiſt*, doth in a Degree quench the *Flame*: (As we ſee *Lights* will goe out in the *Damps* of *Mines*:) And howſoever maketh it burne more dully: And ſo helpeth the *Continuance*. 375

Experiments in Conſort, touching *Burials* or *Infuſions* of divers *Bodies* in *Earth*. 376

Burials in *Earth* ſerve for *Preſervation*; And for *Condenſation*; And for *Induration* of *Bodies*. And if you intend *Condenſation*, or *Induration*, you may

may bury the *Bodies* ſo, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may do for *Conſervation*, if the *Bodies* be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preſervation* of *Bodies*, more Soft and Tender, then you muſt doe one of theſe two: Either you muſt put them in *Caſes*, whereby they may not touch the *Earth*; Or elſe you muſt *Vault* the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the Moiſture, cauſing them to putrifie, than good by the virtuall Cold, to conſerve them; Except the *Earth* be very Drie, and Sandy.

377 An *Orenge*, *Limmon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Fortnights Space, foure Foot deepe within the Earth, though it were in a Moiſt Place, and a Rainy Time, yet came forth, no wayes mouldie, or Rotten, but were become a little harder than they were; Otherwiſe freſh in their Colour; But their Juyce ſomewhat flatted. But with the *Buriall* of a Fortnight more they became Putrified.

378. A *Bottle* of *Beere*, *buried* in like manner, as before, became more lively, better taſted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, ſo buried, came forth more lively, and more Odoriferous, ſmelling almoſt like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as freſh and lively, if not better, than before,

379 It were a profitable *Experiment*, to preſerve *Orenges*, *Limmons*, and *Pomgranates*, till Summer; For then their Price will be mightily increaſed. This may be done, if you put them in a Pot or Veſſell, well covered, that the *Moiſture* of the *Earth* come not at them; Or elſe by putting them in a *Conſervatory* of *Snow*. And generally, whoſoever will make *Experiments* of *Cold*, let him be provided of three Things; A *Conſervatory* of *Snow*; A good *large Vault*, twenty foot at leaſt under the Ground; And a *Deep Well*.

380 There hath beene a Tradition, that *Pearle*, and *Corall*, and *Surchois-Stone*, that have loſt their Colours, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would ſort: But upon Triall of Sixe Weekes *Buriall*, there followed no Effect. It were good to trie it, in a *Deepe Well*; Or in a *Conſervatory* of *Snow*, where the Cold may be more Conſtringent; And ſo make the *Body* more united, and thereby more Reſplendent.

Experiment Solitary, touching the *Affects in Mens Bodies* from ſeverall *Winds*.

381 *Mens Bodies* are heavier, and leſſe diſpoſed to Motion, when *Southerne Winds* blow, than when *Northerne*. The *Cauſe* is, for that when the *Southerne Winds* blow, the Humours doe (in ſome Degree) melt, and waxe fluide, and ſo flow into the Parts; As it is ſeen in *Wood*, and other *Bodies*; which, when the *Southerne Winds* blow, doe ſwell. Beſides, the Motion and Activity of the Body conſiſteth chiefly in the Sinewes, which, when the *Southerne Wind* bloweth, are more relax.

Experiment Solitary touching *Winter* and *Summer Sicknesſes*.

382 It is commonly ſeen, that more are *Sick* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Peſtilent Diſeaſes*, which commonly raigne in *Summer*, or *Autumne*. The Reaſon is, becauſe *Diſeaſes* are bred (indeed) chiefly by *Heat*; But then they are Cured moſt by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is provoked, more Eaſily: As for *Peſtilent Diſeaſes*, the Reaſon why moſt Dye of them in *Summer*, is becauſe they are bred moſt in the *Summer*; For otherwiſe thoſe that are touched are in moſt danger in the *Winter*.

The

Experiment Solitary touching *Peſtilentiall Seaſons.* 383

THe Generall Opinion is, that *Yeares Hot* and *Moiſt*, are moſt *Peſtilent*; Upon the Superficiall Ground, that *Heat* and *Moiſture* cauſe *Putrifaction*. In *England* it is found not true; For, many times, there have beene great *Plagues* in *Drie Yeares*. Whereof the Cauſe may be, for that *Drought* in the Bodies of *Iſlanders*, habituate to *Moiſt Aires*, doth Exaſperate the Humours; and maketh them more apt to Putrifie, or Enflame: Beſides, it tainteth the *Waters* (commonly,) and maketh them leſſe wholeſome. And againe in *Barbary*, the *Plagues* breake up in the *Summer-moneths*, when the *Weather* is *Hot* and *Dry*.

Experiment Solitary touching an *Errour received* about *Epidemicall Diſeaſes.* 384

MAny *Diſeaſes*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the *Cauſe* if falſly imputed to the *Conſtitution* of the *Aire*, at *that time*, when they *breake forth*, or *raigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seaſons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognoſticks*, doth make good Obſervations, of the *Diſeaſes*, that enſue upon the *Nature* of the *Precedent foure Seaſons* of the *Yeare*.

Experiment Solitary touching the *Alteration* or *Preſervation* of *Liquours* in *wells*, or *deepe Vaults.* 385

TRiall hath beene made, with *Earthen Bottles* well ſtopped, hanged in a *Well* of Twenty Fathom deepe, at the leaſt; And ſome of the *Bottles* have bee let downe into the *Water*, ſome others have hanged above, within about a fathome of the *Water*; And the *Liquours* ſo tried have beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Proofe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as above,) have not beene palled or deaded at all; But as good, or ſomewhat better, than *Bottles* of the ſame *Drinkes*, and Staleneſſe, kept in a *Celler*. But thoſe which did hang above *Water*, were apparently the beſt; And that *Beere* did flower a little; whereas that under *Water* did not, though it were Freſh. The *Milke* ſowered, and began to Putrifie. Nevertheleſſe it is true, that there is a *Village* neare *Blois*, where in *Deepe Caves* they doe thicken *Milke*; In ſuch ſort, that it becommeth very pleaſant; Which was ſome *Cauſe* of this Triall of Hanging *Milke* in the *Well*: But our proofe was naught; Neither doe I know, whether that *Milke* in thoſe *Caves*, bee firſt boyled. It were good therefore to trie it with *Milke* Sodden, and with Creame; For that *Milke* of it ſelfe is ſuch a Compouud Body, of *Creame*, *Curds*, and *Whey*, as it is eaſily Turned, and Diſſolved. It were good alſo to trie the *Beere*, when in is in *Wort*, that it may bee ſeene, whether the *Hanging* in the *Well*, will Accelerate the *Ripening* and *Clarifying* of it.

Experiments Solitary, touching *Stutting* 386

DIvers, wee ſee, doe *Stut*. The *Cauſe* may bee, (in moſt,) the *Refrigeration* of the *Tongue*; Whereby it is leſſe apt to move. And therefore wee ſee, that *Naturalls* doe generally *Stut*: And wee ſee that in thoſe that *Stut*, if they drinke Wine moderately, they *Stut* leſſe, becauſe it heateth: And ſo we ſee, that they that *Stut*, doe *Stut* more in the firſt offer to ſpeake, than in Coutinuance; Becauſe the *Tongue* is, by Motion, ſomewhat heated. In ſome alſo, it may be, (though rarely,) the *Drineſſe* of the *Tongue*; which likewiſe maketh it leſſe apt to move, as well as *Cold*; For it is an Affect that cometh to ſome *Wiſe* and *Great Men*; As it did unto *Moſes*, who was *Linguæ Prapeditæ*; And many *Stutters* (wee finde) are very *Cholerike Men*; *Choler* Enducing a *Drineſſe* in the *Tongue*.

Experiments in Conſort, touching the *Smels.*

387 *Smells*, and other *Odours*, are Sweeter in the Aire, at ſome Diſtance, than neare the Noſe; As hath beene partly touched heretofore. The *Cauſe* is double: Firſt the finer Mixture, or Incorporation of the *Smell*: For wee ſee that in *Sounds* likewiſe, they are Sweeteſt, when we cannot heare every Part by it ſelfe. The other *Reaſon* is, for that all *Sweet Smells* have joyned with them, ſome *Earthy* or *Crude Odours*; And at ſome diſtance the *Sweet*, which is the more Spirituall, is perceived; And the *Earthy* reacheth not ſo farre.

388 *Sweet Smells* are moſt forcible, in *Drie Subſtances*, when they are *Broken*; And ſo likewiſe in *Orenges*, or *Limons*, the Nipping of their Rinde, giveth out their *Smell* more: And generally, when *Bodies* are *Moved* or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-Bagge waved. The *Cauſe* is double: The one, for that there is a *Greater Emiſſion* of the *Spirit*, when Way is made: And this holdeth in the *Breaking*, *Nipping*, or *Cruſhing*; It holdeth alſo, (in ſome degree) in the Moving: But in this laſt, there is a Concurrence of the Second *Cauſe*; Which is the *Impulſion* of the *Aire*, that bringeth the *Sent* faſter upon us.

389 The daintieſt *Smells* of *Flowers*, are out of thoſe *Plants*, whoſe *Leaves ſmell* not; As *Violets*, *Roſes*, *Wall-flowers*, *Gilly-flowers*, *Pinckes*, *Wood-bine*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The *Cauſe* is, for that where there is Heat and ſtrength enough in the *Plant*, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather Evanide and Weaker, than that of the *Leaves*; As it is in *Roſe-Mary-Flowers*, *Lavender-Flowers*, and *Sweet-Briar-Roſes*. But where there is leſſe Heat, there the *Spirit* of the *Plant* is diſgeſted and refined, and ſevered from the Groſſer Iuyce, in the *Efflorescence*, and not before.

390 Moſt *Odours* ſmell beſt, *Broken* or *Cruſht*, as hath beene ſaid; But *Flowers Preſſed* or *Beaten*, doe leeſe the Freſhneſſe and Sweetneſſe of their *Odour*. The *Cauſe* is, for that when they are *Cruſhed*, the Groſſer and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in ſtronger *Odours* there are no ſuch Degrees of the Iſſue of the *Smell*.

Experiments in Conſort, touching the *Goodneſſe* and *Choyce* of *Water.*

IT is a Thing of very good Uſe, to Diſcover the *Goodneſſe* of *Waters*. The *Taſte*, to thoſe that Drinke *Water* onely, doth ſomewhat: But other *Experiments* are more ſure. Firſt, try *Waters by Weight*; Wherein you may finde ſome difference, though not much: And the *Lighter* you may account the Better.

391 Secondly, try them by *Boyling* upon an *Equall Fire*; And that which conſumeth away faſteſt, you may account the Beſt.

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393 Thirdly, try them in *Severall Bottles*, or Open Veſſels, Matches in every Thing elſe, and ſee which of them *Laſt Longeſt*, without *Stench*, or *Corruption*: And that which holdeth Unputrified longeſt, you may likewiſe account the Beſt.

394 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the ſame *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nouriſhing; though perhaps it be not ſo good for *Medicinall uſe*. And ſuch *Water* (commonly) is the *Water* of *Large* and *Navigable Rivers*: And likewiſe in *Large* and *Cleane Ponds* of *Standing Water*: For upon both them, the Sunne hath more power than upon Fountaines, or Small Rivers. And I conceive that *Chalke-Water* is next them the beſt, for going furtheſt in *Drinke*: For that alſo helpeth *Concoction*; So it be out of a *Deepe Well*; For then it Cureth the

the Rawneſſe of the *Water*; But *Chalkie Water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloths, which weare out apace, if you uſe ſuch *Waters*.

Fifthly, the Houſwives doe finde a Difference in *Waters*, for the *Bearing* or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* beſt; For the *Hungry water* doth kill the Unctuous Nature of the *Soape*. 365

Sixthly, you may make a Judgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Raine-water* is, by the *Phyſicians* eſteemed the Fineſt, and the beſt; But yet it is ſaid to putrifie ſooneſt; which is likely, becauſe of the Fineneſſe of the Spirit: And in *Conſervatories* of *Raine-water*, (ſuch as they have in *Venice*, &c.) they are found not ſo Choice *Waters*; The worſe, (perhaps,) becauſe they are Covered aloft, and kept from the Sunne. *Snow-water* is held unwholeſome; In ſo much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwiſe upon the Aſcent, (eſpecially the Women,) by drinking of *Snow-water*, have great Bagges hanging under their Throats. *Well-water*, except it be upon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the beſt: For both they ſeeme to have a Lightneſſe, and Appetite of Mounting; And beſides they are moſt pure and unmingled: And againe, are more Percolated thorow a great ſpace of Earth. For *Waters* in *Valleyes*, joyne in effect under Ground with all *Waters* of the ſame Levell; Whereas *Springs* on the *Tops* of *Hills*, paſſe thorow a great deale of Pure *Earth*, with leſſe Mixture of other *Waters*. 396

Seventhly, Judgment may bee made of *Waters* by the *Soyle whereupon the Water runneth*; As *Pebble* is the Cleaneſt, and beſt taſted; And next to that *Clay-water*; And Thirdly, *Water* upon *Chalke*; Fourthly, that upon *Sand*; And Worſt of all upon *Madde*. Neither may you truſt *Waters* that *Taſte Sweet*; For they are commonly found in Riſing Grounds of great *Cities*; which muſt needs take in a great deale of Filth. 397

Experiments Solitary touching the *Temperate Heat* under the *Æquinoctial*.

IN *Peru*, and divers Parts of the *Weſt-Indies*, though under the *Line*, the *Heats* are not ſo Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Cauſes* are, Firſt, the Great *Brizes*, which the Motion of the Aire in great Circles, (ſuch as are under the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in thoſe Parts Noone is nothing ſo hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cauſe* is, for that the Length of the Night, and the Dewes thereof, doe compenſe the *Heat* of the Day. A third *Cauſe* is the Stay of the Sunne; Not in Reſpect of Day and Night, (for that wee ſpake of before,) but in Reſpect of the Seaſon; For under the *Line*, the Sunne croſſeth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth back againe, and ſo maketh one Long Summer. 398

Experiment Solitary touching the *Coloration* of *Blacke* and *Tawney Moores*.

THe *Heat* of the *Sunne* maketh *Men Blacke* in ſome Countries, as in *Æthiopia*, and *Ginny*, &c. *Fire* doth it not, as wee ſee in *Glaſſe-Men*, that are continually about the *Fire*. The *Reaſon* may bee, becauſe *Fire* doth lick up the *Spirits*, and Bloud of the Body, ſo as they Exhale; So that it ever maketh *Men* looke Pale and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud to the Outward *Parts*, And rather Concocteth it, than Soaketh it: And therefore wee ſee that all 399

Æthiopes are Fleſhly, Plumpe, and have great Lips; All which betoken *Moiſture* retained, and not drawne out. We ſee alſo, that the *Negroes* are bred in Countries that have plenty of *Water*, by *Rivers*, or otherwiſe: For *Meroe*, which was the *Metropolis* of *Æthiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of Rivers. And the Confines of the River *Niger*, where the *Negroes* alſo are, are well watered: And the Region about *Capo Verde*, is likewiſe Moiſt, in ſo much as it is peſtilent through Moiſture: But the Countries of the *Abyſſenes*, and *Barbary*, and *Peru*, where they are Tawney, and Olivaſter, and Pale, are generally more Sandy, and Dry. As for the *Æthiopes*, as they are Plumpe, and Fleſhy; So (it may be) they are Sanguine, and ruddy Coloured, if their black Skinne would ſuffer it to be ſeene.

Experiment Solitary touching *Motion* after the *Inſtant* of *Death*

400

SOme *Creatures* doe move a good while after their Head is off, As *Birds*. Some a very little time; As *Men*, and all beaſts. Some move, though cut in ſeverall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. Firſt therefore it is certaine, that the *Immediate Cauſe* of *Death*, is the Reſolution or Extinguiſhment of the *Spirits*; And that the Deſtruction or Corruption of the *Organs*, is but the *Mediate Cauſe*. But ſome *Organs* are ſo peremptorily neceſſary, that the Extinguiſhment of the Spirits doth ſpeedily follow; But yet ſo, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beaſt* hath lowed, after the Heart hath beene ſevered; And it is a Report alſo of Credit, that the *Head* of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or ſevering it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, ſtarke dead, and without Motion; And after a ſmall Time the Braine hath beene replaced, and the Skull of the *Pigge* cloſed, & the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* upon *Revenge* hath been thruſt forth, ſo as it hanged a pretty diſtance by the *Viſuall Nerve*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beaſts* are Large; And therefore, when the *Head* is off, they move little or nothing. But *Birds* have ſmall *Heads*, and therefore the *Spirits* are a little more diſperſed in the *Sinewes*, whereby Motion remaineth in them a little longer; In ſo much as it is Extant in Story, that an *Emperour* of *Rome*, to ſhew the Certainty of his Hand, did Shoot a great Forked Arrow at an *Eſtrich*, as ſhe ran ſwiftly upon the Stage, and ſtrook of her Head; And yet ſhe continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffuſed almoſt all over; And therefore they move in their Severall Pieces.

NATURALL HISTORIE.

V. Century.

WE will now enquire of *Plants* or *Vetegables*: And we ſhall doe it with diligence. They are the principall Part of the *Third dayes work*. They are the firſt *Producat*, which is the Word of *Animation*: For the other Words are but the VVords of *Eſſence*; And they are of excellent and generall Vſe, for Food, Medicine, and a Number of Mechanicall Arts.

Experiments in Conſort touching the *Acceleration* of *Germination*.

There were ſowen in a *Bed*, *Turnip-Seed*, *Radiſh-Seed*, *Wheat*, *Cucumber-Seed* and *Peaſe*. The *Bed* we call a *Hot-Bed*, and the Manner of it is this. There was taken *Horſe-dung*, old, and well rotted; This was laid upon a Banke, halfe a foot high, and ſupported round about with Planks; and upon the Top was caſt Sifted Earth, ſome two Fingers deep; And then the *Seed* ſprinkled upon it, having been ſteeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, & the *VVheat*, came up halfe an Inch above Ground, within two dayes after, without any Watering. The reſt the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have been the ſpeedier. This is a Noble *Experiment*; For without this help, they would have beene foure times as long in comming up. But there doth not occurre to me, at this preſent, any uſe thereof, for profit; Except it ſhould be for Sowing of *Peaſe*, which have their price very much increaſed, by the early Comming. It may be tried alſo with *Cherries*, *Strawberries*, and other Fruit, which are deareſt, when they come early. 401

There was *Wheat*, ſteeped in *Water* mixed with *Cow-dung*; Others in *Water* mixed with *Horſe-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Vrine* of *Man*; Other in *Water* mixed with *Chalke* Powdred; Other in *VVater* mixed with *Soot*, Other in *VVater* mixed with *Aſhes*; Other in *Water* 402

ter mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmſey*; Other in *Spirit* of *Wine*. The proportion of the Mixture was, a fourth Part of the Ingredients to the *Water*; Save that there was not of the *Salt* above an eighth Part. The *Vrine*, and *Wines*, and *Spirit* of *Wine*, were ſimple without mixture of *Water*. The Time of Steeping was twelve hours. The Time of the Yeare *October*. There was alſo other *Wheat* ſowen *unſteeped*, but *watred* twice a day with *Warm water*. There was alſo other *Wheat* ſowen *Simple* to compare it with the reſt. The event was; that thoſe that were in the Mixture of *Dung*, and *Vrine*, *Soot*, *Chalk*, *Aſhes*, and *Salt*, came up within 6 dayes: And thoſe that afterwards proved the Higheſt, Thickeſt, and moſt Luſtie, were, firſt the *Vrine*, and then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Aſhes*; Next the *Salt*; Next the *Wheat Simple* of it ſelfe, unſteeped, and unwatered; Next the *Watred twice a day* with warme water; Next the *Claret Wine*. So that theſe three laſt were ſlower that the Ordinary *Wheat* of it ſelfe; And this Culture did rather retard, than advance. As for thoſe that were ſteeped in *Malmſey*, and *Spirit* of *Wine*, they came not up at all. This is a Rich *Experiment* for Profit; For the moſt of the Steepings are Cheape Things; And the goodneſſe of the Crop is a great Matter of Gaine; If the Goodneſſe of the Crop anſwer the Earlineſſe of the Comming up: As it is like it will; Both being from the Vigour of the *Seed*; Which alſo partly appeared in the former *Experiment*, as hath been ſaid. This *Experiment* would be tried in other *Grains*, *Seeds*, and *Kernells*; For it may be ſome Steeping will agree beſt with ſome *Seeds*. It would be tried alſo with *Roots* ſteeped as before, but for *longer time*. It would be tried alſo in *Severall Seaſons* of the *Yeare*, eſpecially in the *Spring*.

403 *Strawberries* watered now and then, (at once in three dayes.) with *Water*, wherein hath been ſteeped *Sheepes-dung*, or *Pigeons-dung*, will prevent and come early. And it is like the ſame Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Grains* or *Trees*. And therefore it is an *Experiment*, though vulgar in *Strawberries*, yet not brought into uſe generally: For it is uſuall to help the Ground with Mucke; And likewiſe to Recomfort it ſometimes with Muck put to the Roots; But to water it with *Muck water*, which is like to be more Forcible, is not practiſed.

404 *Dung*, or *Chalke*, or *Bloud*, applied in Subſtance, (ſeaſonably,) to the Roots of Trees, doth ſet them forwards. But to doe it unto *Herbs*, without Mixture of *Water* or *Earth*, it may be theſe helps are too Hot.

405 The former *Means* of helping *Germination*, are either by the *Goodneſſe* and *Strength* of the *Nouriſhment*; Or by the *Comforting* & *Exciting* the *Spirits* in the *Plant*, to draw the Nouriſhment better. And of this latter kind, concerning the *Comforting* of the *Spirits* of the *Plant*, are alſo the experiments that follow; Though they be not Applications to the *Root*, or *Seed*. The *Planting* of *Trees warme* upon a *Wall*, againſt the South, or South Eaſt Sunne, doth haſten their Comming on, and Ripening; And the South-Eaſt is found to be better than the South-Weſt, though the South-Weſt be the Hotter Coaſt. But the cauſe is cheifly, for that the Heat of the Morning ſucceedeth the Cold of the Night; and partly, becauſe, (many times) the South-weſt Sunne is too Parching. So likewiſe the *Planting* of them upon the *Back* of a *Chimney* where a *Fire* is kept, doth haſten their Comming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inſide* of a *Room*, where a Fire is continually kept, worketh the ſame Effect; which hath been tried with Grapes; In ſo much as they will come a Moneth earlier, than the Grapes abroad.

Beſides

406 Beſides the two *Meanes* of *Accelerating Germination*, formerly deſcribed; That is to ſay, the *Mending* of the *Nouriſhment*; *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making Way* for the *Eaſie Comming* to the *Nouriſhment*, and *Drawing* it. And therefore *Gentle Digging* and *Looſening* of the *Earth* about the *Roots* of *Trees*; And the *Removing Herbes* and *Flowers* into new Earth, once in two yeares, (which is the ſame thing; For the new Earth is ever looſer,) doth greatly further the *Proſpering*, and *Earlineſſe* of *Plants*.

407 But the moſt admirable *Acceleration* by *Facilitating* the *Nouriſhmeut*, is that of *Water*. For a *Standard* of a *Damaske* Roſe with the *Root* on, was ſet in a Chamber, where no Fire was, upright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot under the *Water*, the *Standard* being more than two Foot high above the *Water*: Within in the Space of ten dayes, the *Standard* did put forth a faire Greene leafe, and ſome other little Buds, which ſtood at a ſtay, without any Show of decay or withering, more than ſeven Dayes. But afterwards that Leafe faded, but the young Buds did ſprout on; which afterward opened into fair Leaves, in the ſpace of three Moneths; And continued ſo a while after, till upon Removall we left the Triall. But note that the *Leaves* were ſomewhat paler, & lighter-colored, than the *Leaves* uſe to be abroad. Note that the firſt *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would have put forth with greater ſtrength, and (it may be) to have growne on to beare Flowers. By this Meanes, you may have, (as it ſeemeth,) *Roſes* ſet in the middeſt of a *Poole*, being ſupported with ſome ſtay; Which is Matter of Rareneſſe and Pleaſure, though of ſmall Uſe. This is the more ſtrange, for that the like *Roſe-ſtandard* was put, at the ſame time, into *Water* mixed with *Horſe-aung*, the Horſe-dung about the fourth Part to the *Water*, and in foure Moneths ſpace (while it was obſerved) put not forth any *Leafe*, though divers *Buds* at the firſt, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewiſe put, at the ſame time, all under *Water*, ſome two or three Fingers deep; And within ſeven dayes ſprouted, and continued long after, further Growing. There were alſo put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddiſh-Root*, which had all their *Leaves* cut almoſt cloſe to the *Roots*; And within ſix weekes had faire *Leaves*; And ſo continued, till the end of *November*.

409 Note that if *Roots*, or *Peaſe*, or *Flowers*, may be *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that thoſe Things beare when they come early: The other in the *Swiftneſſe* of their *Returnes*: For in ſome Grounds which are ſtrong, you ſhall have a *Raddiſh*, &c. come in a Moneth; That in other Grounds will not come in two; And ſo make double *Returnes*.

410 *Wheat* alſo was put into the *Water*, and came not forth at all; So as it ſeemeth there muſt be ſome Strength and Bulke in the Body, put into the *water*, as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But caſually ſome *Wheat* lay under the Pan, which was ſomewhat moiſtened by the Suing of the Pan; which in ſix weekes (as aforeſaid) looked mouldy to the Eye, but it was ſprouted forth halfe a Fingers length.

411 It ſeemeth by theſe *Inſtances* of *Water*, that for Nouriſhment, the *Water* is almoſt all in all, and that the *Earth* doth but keepe the *Plant* upright, and ſave it from Over-heat, and Over-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proveth alſo that our former *Opinion*; That

Drinke

Drinke incorporate with Fleſh, or Roots, (as in *Capon-Beere*, &c.) will nouriſh more eaſily, than Meat and Drinke taken ſeverally.

412 The *Houſing* of *Plants* (I conceive) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seaſons*: And as we *Houſe* Hot *Countrey Plants*, as *Limons*, *Orenges*, *Myrtles*, to ſave them; So we may *Houſe* our own *Countrey Plants*, to forward them, and make them come in the Cold Seaſons; In ſuch ſort, that you may have *Violets*, *Strawberries*, *Peaſe*, all Winter: So that you ſow, or remove them at fit times. This *Experiment* is to be referred unto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Houſing* their *Boughs*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments in Conſort, touching the *Putting back* or *Retardation* of *Germination*

TO make *Roſes*, or other *Flowers* come late, it is an *Experiment* of Pleaſure. For the Ancients eſteemed much of *Roſa Sera*. And indeed the *November-Roſe* is the ſweeteſt, having been leſſe exhaled by the Sunne. The Meanes are theſe. Firſt, the *Cutting off their Tops*, immediately after they have done Bearing;

413 And then they will come againe the ſame yeare about *November*: But they will not come juſt on the Tops, where they were cut, but out of thoſe Shoots, which were (as it were,) *Water Boughs*. The *Cauſe* is, for that the Sap, which otherwiſe would have fed the Top, (though after Bearing,) will, by the diſcharge of that, divert unto the Side-Sprouts; And they will come to beare, but later.

414 The Second is the *Pulling off the Buds of the Roſe*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cauſe* is the ſame with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the ſame Effect, in Retention of the Sap for a time, and Diverſion of it to the Sprouts, that were not ſo forward.

415 The Third is the *Cutting* off ſome few of the *Top-Boughes* in the *Spring-time*, but ſuffering the lower Boughes to grow on. The *Cauſe* is, for that the Boughes doe helpe to draw up the Sap more ſtrongly; And we ſee that in Powling of Trees, many doe uſe to leave a Bough or two on the Top, to helpe to draw up the Sap. And it is reported alſo, that if you graft upon the Bough of a Tree, and cut off ſome of the old Boughes, the new Cions will periſh.

416 The Fourth is by *Laying the Roots bare about Chriſtmas*, ſome dayes. The *Cauſe* is plaine, for that it doth arreſt the Sap, from going upwards, for a time; Which Arreſt is afterwards releaſed by the Covering of the Root againe with Earth; And then the Sap getteth up, but later.

417 The Fifth is the *Removing* of the *Tree*, ſome Moneth before it *Buddeth*. The *Cauſe* is, for that ſome time will be required after the *Remove*, for the Reſetling, before it can draw the Juyce; And that time being loſt, the Bloſſome muſt needs come forth later.

418 The Sixth is the *Grafting* of *Roſes* in *May*, which commonly Gardiners doe not till *July*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the ſame yeare, but late.

419 The Seventh is the *Girding* of the *Body* of the *Tree* about with ſome Packthreed; For that alſo in a degree, reſtraineth the Sap, and maketh it come up more late, and more Slowly.

420 The Eighth is the *Planting* of them in a *Shade*, or in a *Hedge*. The *Cauſe* is, partly the Keeping out of the Sunne, which haſteneth the Sap to riſe; And partly the Robbing of them of Nouriſhment, by the Stuffe in the *Hedge*. Theſe meanes may be practiſed upon other, both Trees, and Flowers, *Mutatis Mutandis*.

Men

421 Men have entertained a Conceit that ſheweth pretily; Namely, that if you graft a *Late-Comming Fruit*, upon a Stocke of a *Fruit-Tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach upon a Cherry; And contrariwiſe, if an *Early-Comming-Fruit* upon a Stock of a *Fruit-Tree* that *Commeth late*, the Graft will beare Fruit late; As a Cherry upon a Peach. But theſe are but Imaginations, and untrue. The *Cauſe* is, for that the Cions overruleth the Stock quite; And the Stock is but Paſſive onely, and giveth Aliment, but no Motion to the Graft.

Experiments. in Conſort, touching the *Melioration* of *Fruit*, *Trees*, and *Plants*.

VVee will ſpeake now, how to make *Fruits*, *Flowers*, and *Roots* larger, in more plenty; and ſweeter than they uſe to be; And how to make the *Trees* themſelves, more Tall; more Spread; and more Haſty and Sudden; than they uſe to bee. VVherein there is no doubt, but the former *Experiments* of *Acceleration*, will ſerve much to theſe Purpoſes. And againe, that theſe *Experiments*, which we ſhall now ſet downe, doe ſerve alſo for *Acceleartion*; becauſe both Effects proceed from the Encreaſe of vigour in the Tree; But yet to avoid Confuſion; And becauſe ſome of the Meanes are more proper for the one Effect, and ſome for the other, we will handle them apart.

422 It is an aſſured Experience, that an *Heape* of *Flint* or *Stone*, laid about the *Bottome* of a *Wild-Tree*, (as an Oake, Elme, Aſh, &c.) upon the firſt Planting, doth make it proſper double as much, as without it. The *Cauſe* is, for that it retaineth the Moiſture, which falleth at any time upon the *Tree*, and ſuffereth it not to be exhaled by the Sunne. Againe, it kepeth the Tree warme, from Cold Blaſts and Froſts, as it were in an Houſe. It may be alſo, there is ſomewhat in the Keeping of it ſteady at the firſt. *Quære*, if Laying of Straw ſome Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giveth the Sap, yet it is the Body that draweth it. But you muſt note, that if you lay *Stones* about the ſtalke of Lettuce, or other Plants, that are more ſoft, it will over-Moiſten the Roots, ſo as the Wormes will eate them.

423 A *Tree*, at the firſt *Setting*, ſhould not be *Shaken*, untill it hath *taken Root fully*: And therefore ſome have put two little Forkes about the Bottome of their *Trees*, to keep them upright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Looſening of the Earth, and (perhaps) by Exerciſing (as it were) and Stirring the Sap of the *Tree*.

424 Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwiſe, the *Powling* and *Cutting* of the Top, maketh them grow ſpread, and buſhy. As we ſee in *Pollards*, &c.

425 It is reported, that to make *haſty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of ſome ſeven yeares growth; And to ſet them, not upright, but a-ſlope, a reaſonable depth under the Ground; And then, inſtead of one Root, they will put forth many, and ſo carry more Shoots upon a Stemme.

426 When you would have *many new Roots* of *Fruit Trees*, take a *Low Tree*, and bow it, and lay all his branches a-flat upon the Ground, and caſt Earth upon them; And every Twigge will take Root. And this is very profitable

ble *Experiment* for Coſtly *Trees*; (for the Boughes will make Stockes without charge;) Such as are *Apricots*, *Peaches*, *Almonds*, *Cornelians*, *Mulberries*, *Figs*, &c. The like is continually practiſed with *Vines*, *Roſes*, *Muske-Roſes*, &c.

427 From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bigneſſe of three or foure Inches, and cover the bare Place, ſomewhat above, and below, with Loame well tempered with Horſe-dung, binding it faſt downe. Then cut off the Bough about *Alhallontide* in the bare Place, and ſet it in Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cauſe* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from deſcending towards Winter, and ſo holdeth it in the Bough; And it may bee alſo that the Loam and Horſe-dung applyed to the bare place, doe moiſten it, and cheriſh it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the Sap of *Trees* in their Boughes; Which may ſerve to other Effects.

428 It hath been practiſed in *Trees*, that ſhew faire, and beare not, to *Bore a Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be, for that the *Tree* before had too much *Repletion*, and was oppreſſed with his owne Sap; For *Repletion* is an Enemie to Generation.

429 It hath beene practiſed in *Trees*, that doe not beare, to cleave two or three of the Chiefe Roots, and to put into the Cleft a ſmall Pebble, which may keepe it open, and then it will beare. The *Cauſe* may be, for that a Root of a Tree may be (as it were,) Hide-bound, no leſſe than the Body of the Tree; but it will not keep open without ſomewhat put into it.

430 It it uſually practiſed, to ſet *Trees* that require much *Sunne*, upon *Walls* againſt the *South*; As *Apricots*, *Peaches*, *Plums*, *Vines*, *Figs*, and the like. It hath a double Commoditie; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the upper Boughes over-ſhadow the lower: But when it is ſpread upon a Wall, the Sunne commeth alike, upon the upper, and lower Branches.

431 It hath alſo been practiſed (by ſome) to pull off ſome *Leaves* from the *Trees* ſo *ſpread*, that the Sunne may come upon the *Bough* and *Fruit* the better. There hath been practiſed alſo a Curioſitie, to ſet a *Tree* upon the *North-Side* of a Wall, and at a little height, to draw him thorow the Wall, and ſpread him upon the *South-Side*: Conceiving that the Root and lower Part of the Stocke ſhould enjoy the Freſhneſſe of the Shade; And the Upper Boughes, and Fruit, the Comfort of the Sunne. But it ſorted not; The *Cauſe* is, for that the *Root* requireth ſome Comfort from the Sunne, though under Earth, as well as the *Bodie*: And the Lower Part of the Bodie more than the Upper, as wee ſee in Compaſſing a *Tree* below with ſtraw.

432 The *Lowneſſe* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you ſhall ever ſee in *Apricots*, *Peaches*, or *Melo-Cotones*, upon a wall, the greateſt Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow upon the low Vines, bound to ſmall Stakes. And the raiſed Vines in Arbours make but Verjuyce. It is true, that in *Italy*, and other *Countries*, where they have hotter Sunne, they raiſe them upon *Elmes*, and Trees; But I conceive, that if the *French* Manner of Planting low, were brought in uſe, their *Wines* would be ſtronger and ſweeter. But it is more chargeable in reſpect of the Props. It were good to trie whether a *Tree* grafted ſomewhat neare the Ground, and the lower boughes onely maintained, and the higher continually proined off, would not make a larger *Fruit*.

To

433 To have *Fruit* in *Greater Plentie*, the way is, to graft, not only upon young *Stocks*, but upon divers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but upon one Stocke, the *Tree* can beare but few.

434 The *Diging* yearely about the *Roots* of *Trees*, which is a great meanes, both to the *Acceleration* and *Melioration* of *Fruits*, is practiſed in nothing but in *Vines*; Which if it were transferred unto other *Trees*, and *Shrubs*, (as *Roſes*, &c.) I conceive would advance them likewiſe.

435 It hath beene knowne, that a *Fruit-Tree* hath beene blown up (almoſt) by the Roots, and ſet up againe, and the next yeare bare exceedingly. The *Cauſe* of this, was nothing but *Looſening* of the *Earth*, which comforteth any *Tree*, and is fit to be practiſed, more than it is, in *Fruit-Trees*: For *Trees* cannot be ſo fitly removed into New Grounds, as *Flowers* and *Herbs* may.

436 To revive an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the Roots, is the Way. We ſee alſo that *Draught-Oxen*, put into freſh Paſture, gather new and tender Fleſh; And in all Things, better Nouriſhment than hath been uſed, doth helpe to renew; Eſpecially, if it be not onely better, but changed, and differing from the former.

437 If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of very great Magnitude in Summer. The Reaſon is, for that the Moiſture being forbidden to come up in the Plant, ſtayeth longer in the Root, and ſo dilateth it. And *Gardiners* uſe to tread downe any looſe Ground, after they have ſowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottome of a *Root*, it will cauſe the Root to grow to an Exceſſive Bigneſſe. The *Cauſe* is, for that being it ſelfe of a Spungy Subſtance, it draweth the Moiſture of the Earth to it, and ſo feedeth the Root. This is of greateſt uſe for *Onions*, *Turnips*, *Parſnips*, and *Carrets*.

439 The *Shifting* of *Ground* is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things doe proſper beſt, when they are advanced to the better: Your *Nurſerie* of *Stocks* ought to be in a more Barren Ground, than the Ground is whereunto you remove them. So all *Graſiers* preferre their Cattell from meaner Paſtures to better. VVe ſee alſo, that Hardneſſe in Youth lengtheth Life, becauſe it leaveth a Cheriſhing to the better, of the Body, in Age: Nay in Exerciſes, it is good to begin with the hardeſt, as Dancing in Thicke Shooes, &c.

440 It hath beene obſerved, that *Hacking* of *Trees* in their *Barke*, both downe-right, and acroſſe, ſo as you make them rather in ſlices, than in continued Hacks, doth great good to *Trees*, And eſpecially delivereth them from being *Hide-bound*, and killeth their Moſſe.

441 *Shade* to ſome *Plants* conduceth to make them large and proſperous, more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongſt *Strawberries*, ſow here and there ſome *Borrage-Seed*; And you ſhall finde the *Strawberries* under thoſe Leaves farre more large than their Fellowes. And *Bayes* you muſt plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you ſow the *Berries*, weed not the *Borders*, for the firſt halfe yeare; For the *Weed* giveth them *Shade*.

442 To increaſe the *Crops* of *Plants*, there would be conſidered, not onely the *Increaſing* the *Luſt* of the *Earth*, or of the *Plant*, but the Saving alſo of that which is ſpilt. So they have lately made a Triall, to *Set Wheat*; which nevertheleſſe

vertheleſſe hath beene left off, becauſe of the trouble and paines; Yet ſo much is, true that there is much ſaved by the *Setting*, in compariſon of that which is *Sowen*; Both by keeping it from being picked up by Birds; And by Avoiding the Shallow lying of it, whereby much that is ſowen taketh no Root.

443 It is preſcribed by ſome of the *Ancients*, that you take *Small Trees*, upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the Middle of *Autumne* with dung, untill the Spring; And then take them up in a warme day, and replant them in good Ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the ſame kinde, doe but bloſſome. But this ſeemeth to have no great Probabilitie.

444 It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thickneſſe of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will ſprout forth within eight dayes. The *Cauſe* is like to be, (if the *Experiment*, be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*.

445 Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come up much earlier than in the *Earth* it ſelf. This I conceive to be as a Kinde of *Grafting* in the *Root*; For as the Stocke of a Graft yeeldeth better prepared Nouriſhment to the Graft, than the Crude Earth; So the *Squill* doth the like to the *Seed*. And I ſuppoſe the ſame would be done, by *Putting Kernells* into a *Turnip*, or the like; Save that the *Squill* is more Vigorous, and Hot. It may bee tried alſo, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in ſeverall places, when it is almoſt at his Bigneſſe, and before it ripeneth, hath beene practiſed with ſucceſſe, to ripen the Fruit more ſuddenly. We ſee the Example of the *Biting* of *Waſpes*, or *Wormes*, upon *Fruit*, whereby it (manifeſtly) ripeneth the ſooner.

447 It is reported, that *Alga Marina* (*Sea-Weed*) put under the *Roots* of *Colworts*, and (perhaps) of other *Plants*, will further their Groweth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertilitie.

448 It hath beene practiſed, to cut off the Stalkes of *Cucumbers*, immediately after their *Bearing*, cloſe by the Earth; And then to caſt a pretty Quantity of Earth upon the *Plant* that remaineth, and they will bear the next year Fruit, long before the ordinarie time. The *Cauſe* may be, for that the Sap goeth downe the ſooner, and is not ſpent in the Stalke or Leafe, which remaineth after the Fruit. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annuall*, ſeemeth to be partly cauſed by the Over-Expence of the Sap into Stalke, and Leaves; which being prevented, they will ſuper-annate, if they ſtand warme.

449 The *Pulling off* many of the *Bloſſomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cauſe* is manifeſt; For that the Sap hath the leſſe to nouriſh. And it is a Common Experience, that if yon doe not pull off ſome *Bloſſomes*, the firſt time a *Tree* bloometh, it will bloſſome it ſelfe to death.

450 It were good to trie, what would be the Effect, if all the *Bloſſomes* were pulled from a *Fruit-Tree*; Or the *Acornes*, and *Cheſnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I ſuppoſe that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit*; Or elſe, the ſame yeares, larger Leaves, becauſe of the Sap ſtored up.

It

It hath been generally received, that a *Plant watered* with *Warme Water*, will come up ſooner and better, than with Cold Water, or with Showers. But 451
ut Experiment of *Watering Wheat* with *Warm Water* (as hath been ſaid) ſucceeded not; which may be, becauſe the Triall was too late in the Yeare, *viz.* in the End of *October*. For the Cold then comming upon the *Seed*, after it was made more tender by the Warm Water, might checke it.

There is no doubt, but that *Grafting* (for the moſt Part) doth *meliorate* the *Fruit*. The *Cauſe* is manifeſt; For that the Nouriſhment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there bee ſome *Trees*, that are ſaid to come up more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cauſe* I ſuppoſe to bee, for that thoſe *Plants* require a Nouriſhment of great Moiſture; And though the Nouriſhment of the *Stocke* be finer, and better prepared, yet it is not ſo moiſt, and plentifull, as the Nouriſhment of the *Earth*. And indeed we ſee thoſe *Fruits* are very Cold *Fruits* in their Nature. 452

It hath been received, that a Smaller *Peare*, grafted upon a *Stocke* that beareth a Greater *Pear*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* upon the *Late Stocke*; And *è controverſo*; Which we rejected before: For the *Cions* will governe. Nevertheleſſe it is probable enough, that if you can get a *Cions* to grow upon a *Stocke* of another kinde, that is much moiſter than his owne *Stocke*, it may make the *Fruit* Greater, becauſe it will yeeld more plentifull Nouriſhment; Though it is like it will make the *Fruit* Baſer. But generally the *Grafting* is upon a drier *Stock*; As the *Apple* upon a *Crab*; The *Peare* upon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* upon the *Stocke* of a *Colewort*, and it will bear a great flaggy *Apple*; The *Kernell* of which, if it be ſet, will be a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cions* will proſper, if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elme*, or upon an *Horſe-Plumme*, which are the moyſteſt of *Trees*. I have heard that it hath been tried upon an *Elme*, and ſucceeded. 453

It is manifeſt by Experience, that *Flowers* Removed wax greater, becauſe the Nouriſhment is more eaſily come by, in the looſe Earth. It may bee, that Oft Regrafting of the ſame *Cions*, may likewiſe make *Fruit* greater; As if you take a *Cions*, and graft it upon a *Stock* the firſt yeare; And then cut it off, and graft it upon another *Stock* the ſecond year; And ſo for a third; Or fourth yeare; And then let it reſt, it will yeeld afterward, when it beareth, the greater *Fruit*. 454

Of Grafting *there are many* Experiments *worth the Noting, but thoſe we reſerve to a proper Place.*

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leavs, have his Top cut off. The *Cauſe* is plaine, for that the Sap hath the leſſe to feed, and the leſſe way to mount: But it may be the *Figge* will come ſomewhat later, as was formerly touched. The ſame may bee tried likewiſe in other *Trees*. 455

It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Trunke* of the *Tree* thorow, in ſeverall places, and thruſt into the Places bored, Wedges of ſome Hot *Trees*, as *Turpentine*, *Maſtick-Tree*, *Guaiacum*, *Juniper*, &c. The *Cauſe* may be, for that Adventive Heat doth chear up the Native Juyce of the *Tree*. 456

It is reported, that *Trees* will grow greater, and bear better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Bloud* to the *Root*. The *Cauſe* may be the En- 457

creaſing the Luſt or Spirit of the *Root*; Theſe Things being more forcible, than ordinary *Compoſts*.

458 It is reported by one of the Ancients, that *Artichoakes* will be leſſe prickly, and more tender, if the *Seeds* have their Tops dulled, or grated off upon a Stone.

459 *Herbs* will be tenderer, and fairer, if you take them out of *Beds*, when they are newly come up, and remove them into *Pots*, with better *Earth*. The Remove from *Bed* to *Bed* was ſpoken of before; But that was in ſeverall yeares; This is upon the ſudden. The *Cauſe* is the ſame with other *Removes*, formerly mentioned.

460 *Coleworts* are reported by one of the Ancients, to proſper exceedingly, and to be better taſted, if they be ſometimes watred with *Salt-water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is leſſe Adurent than *Salt*.

461 It is reported, that *Cucumbers* will prove more Tender and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cauſe* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the groſſer Juyce of the Earth, but onely the finer. The ſame *Experiment* may be made in *Artichoakes*; and other *Seeds*, when you would take away, either their Flaſhineſs, or Bitterneſſe. They ſpeake alſo, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that ſeemeth to me not ſo probable, becauſe *Honey* hath too Quicke a Spirit.

462 It is reported, that *Cucumbers* will be leſſe *Watrie*, and more *Melon-like*, if in the Pit where you ſet them, you fill it (halfe way up) with *Chaffe*, or ſmall *Sticks*, and then powre *Earth* upon them; For *Cucumbers*, as it ſeemeth, doe extremely affect Moiſture; And over-drinke themſelves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is growne, you ſet a Pot of water about five or ſix Inches diſtance from it, it will, in 24. houres, ſhoot ſo much out, as to touch the Pot; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it diſcovereth *Perception* in *Plants*, to move towards that which ſhould help and comfort them, though it be at a diſtance. The ancient Tradition of the *Vine* is farre more ſtrange: It is, that if you ſet a Stake, or Prop, ſome diſtance from it, it will grow that way; Which is far ſtranger (as is ſaid) than the other: For that *Water* may work by a *Sympathie* of *Attraction*: But this of the *Stake* ſeemeth to be a Reaſonable Diſcourſe.

463 It hath been touched before, that *Terebration* of *Trees* doth make them proſper better. But it is found alſo, that it maketh the *Fruit* ſweeter, and better. The *Cauſe* is, for that notwithſtanding the *Terebration*, they may receive Aliment ſufficient; And yet no more than they can well turn, and diſgeſt; And withall doe ſweat out the courſeſt and unprofitableſt Juyce; Even as it is in *Living Creatures*; which by Moderate Feeding, and Exerciſe, and Sweat, attain the ſoundeſt Habite of Body.

464 As *Terrebration* doth *Meliorate Fruit*, ſo, upon the like reaſon, doth *Letting* of *Plants Bloud*; As *Pricking Vines*, or other *Trees*, after they be of ſome Growth; And thereby letting forth *Gumme*, or *Teares*; Though this be not to continue, as it is in *Terebration*, but at ſome Seaſons. And it is reported, that by this Artifice, *Bitter Almonds* have been turned into *Sweet*.

465 The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-Dung* above all other *Dung*, Which may be, becauſe of the Moiſture of that Beaſt, whereby the *Excrement* hath leſſe Acrimony; For we ſee *Swines* and *Pigges* Fleſh is the Moiſteſt of Fleſhes.

466 It is obſerved by ſome, that all *Heros* wax ſweeter, both in Smell and Taſt, if after they be grown up ſome reaſonable time, they be cut, and ſo you take the later Sprout. The *Cauſe* may be for that the longer the Juyce ſtayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Cauſes, why *Grains*, *Seeds*, and *Fruits*, are more Nouriſhing than *Leaves*, is the length of time, in which they grow to *Maturation*. It were not amiſſe to keep back the Sap of *Herbs*, or the like, by ſome fit means, till the end of Summer; whereby it may be they will be more Nouriſhing.

467 As *Grafting* doth generally advance and *Meliorate Fruits*, above that which they would be, if they were ſet of *Kernels*, or *Stones*, in regard the *Nouriſhment* is better concocted; So (no doubt) even in *Grafting*, for the ſame cauſe, the Choyce of the *Stocke* doth much; Alwayes provided, that it be ſomewhat inferiour to the *Cions*: For otherwiſe it dulleth it. They commend much the *Grafting* of *Peares*, or *Apples*, upon a *Quince*.

468 Beſides the *Means* of *Melioration* of *Fruits*, before mentioned, it is ſet downe as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (eſpecially laid up together for a Moneth to rot,) is a very great Nouriſher, and Comforter to a *Fruit-Tree*.

469 It is delivered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twenty dayes, and then ſet againe; And yet more, if the outermoſt Pill be taken off all over.

470 It is delivered by ſome, that if one take the *Bough* of a *Low-Fruit-Tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the bottome to let in the *Plant*, and then cover the *Pot* with Earth, it will yeeld a very lage *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Removing, and Leaving the *Fruit* in the Earth. The like, (they ſay,) will be effected, by an Empty *Pot* without Earth in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if ſome few Perturſions be made in the *Pot*. Wherein, beſides the Defending of the *Fruit*, from Extremity of Sunne or Weather, ſome give a reaſon, that the *Fruit*, Loving and Coveting the open Aire and Sun, is invited by thoſe Perturſions, to ſpread and approch, as neare the open Aire, as it can; and ſo enlargeth in *Magnitude*.

471 All *Trees*, in *High* and *Sandy Grounds*, are to be ſet deep; And in *Watry Grounds*, more ſhallow. And in all *Trees*, when they be removed (eſpecially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coaſted, (*North* and *South*, &c.) as they ſtood before. The ſame is ſaid alſo of *Stone* out of the *Quarry*, to make it more durable; Though that ſeemeth to have leſſe reaſon; Becauſe the *Stone* lyeth not ſo neare the Sunne, as the *Tree* groweth.

472 *Timber Trees* in a *Coppice Wood*, do grow better, than in an *Open Field*; Both becauſe, they offer not to ſpread ſo much, but ſhoot up ſtill in Height; And chiefly becauſe they are defended from too much Sunne and Winde, which doe checke the Growth of all *Fruit*; And ſo (no doubt) *Fruit-Trees*, or *Vines*, ſet upon a *Wall*, againſt the Sunne, betweene Elbowes or Buttreſſes of Stone, ripen more, than upon a Plaine Wall.

573 It is ſaid, that if *Potado Roots*, be ſet in a *Pot* filled with Earth, and then the *Pot* with Earth be ſet likewiſe within the Ground, ſome two or three Inches, the *Roots* will grow greater, than Ordinary. The *Cauſe* may be, for that Having Earth enough within the *Pot* to nouriſh them; And then being ſtopped by the Bottome of the *Pot* from putting Strings downward, they muſt needs grow greater in Breadth, and Thickneſſe. And it may be,

that all *Seeds* or *Roots*, *Potted*, and ſo ſet into the *Earth*, will proſper the better.

474 The *Cutting off* the *Leaves* of *Radiſh*, or other *Roots*, in the beginning of Winter, before they wither; And Covering againe the *Roots*, ſomething high with Earth, will preſerve the *Root* all Winter, and make it bigger, in the Spring following, as hath been partly touched before. So that there is a double Uſe of this *Cutting off* the *Leaves*: For in *Plants*, where the *Root* is the *Eſculent*, as *Radiſh*, and *Parſnips*, it will make the *Root* the greater; And ſo it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Eſculent*, by ſtrengthning the *Root*, it will make the *Fruit* alſo the greater.

475 It is an *Experiment* of great pleaſure, to make the *Leaves* of *Shady Trees*, larger than ordinary. It hath been tryed (for certaine) that a *Cion* of a *Weech-Elme*, grafted upon the Stocke of an Ordinary *Elme*, will put forth Leaves, almoſt as broad as the Brimme of ones Hat. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that bear no *Fruit*, it will make the greater *Leaves*. It would be tryed therefore in *Trees* of that kinde chiefly; As *Birch*, *Aſp*, *willow*; And eſpecially the *Shining Willow*, which they call *Swallow-Taile*, becauſe of the pleaſure of the Leaſe.

476 The *Barrenneſſe* of *Trees* by *Accident*, (beſides the *Weakneſſe* of the *Soile*, *Seed*, or *Roote*, and the *Injurie* of the *Weather*) comming either of their *Overgrowing* with *Moſſe*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Iſſuing* of the *Sap too much into the* Leaves. For all theſe there are *Remedies* mentioned before.

Experiments in Conſort, touching *Compound Fruits* and *Flowers*.

Wee ſee that in *Living Creatures*, that have *Male* and *Female*, there is Copulation of ſeverall Kindes; and ſo *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horſe* and *Aſſe*; And ſome other *Compounds*, which we call *Monſters*, though more rare: And it is held, that that *Proverb*, *Africa ſemper aliquid Monſtri parit*, cometh, for that the Fountains of VVaters there, being rare, divers Sorts of Beaſts come from ſeverall Parts to drink; And ſo being refreſhed, fall to couple, and many times with ſeverall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; which nevertheleſſe, if it be poſsible, is more at command than that of *Living Creatures*; For that their Luſt requireth a voluntary Motion: wherefore it were One of the moſt Notable *Experiments* touching *Plants*, to finde it out: For ſo you may have great Varietie of New-*Fruits*, and *Flowers* yet unknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kind*. For the *Cions* ever over-tuleth the *Stock*.

477 It hath been ſet downe by one of the *Ancients*, that if you take two *Twigs* of ſeverall *Fruit Trees*, and flat them on the Sides, and then bind them cloſe together, and ſet them in the ground, they will come up in one Stocke; But yet they will put forth their ſeverall *Fruits* without any *Commixture* in the *Fruit*. VVherein note (by the way) that *Vnity* of *Continuance*, is eaſier to procure,

procure, than *Vnity* of *Species*. It is reported alſo that *Vines* of *Red* and *White Grapes*, being ſet in the Ground, and the upper Parts being flatted, and bound cloſe together, will put forth *Grapes* of the ſeverall Colours, upon the ſame Branch; And *Grape-Stones* of ſeverall Colours within the ſame *Grape*: But the more, after a yeare or two; The Unity (as it ſeemeth) growing more Perfect. And this will likewiſe helpe, if from the firſt *Vniting*, they be often Watred; For all Moiſture helpeth to *Vnion*. And it is preſcribed alſo, to binde the *Bud*, as ſoon as it commeth forth, as well as the *Stocke*; At the leaſt for a time.

They report, that divers *Seeds* put into a *Clout*, and laid in Earth well dunged, will put up *Plants Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is ſaid of *Kernels* put into a *Bottle* with a Narrow Mouth, filled with Earth. 478

It is reported, that young *Trees* of ſeverall kindes, ſet contiguous without any binding, and very often Watred, in a *Fruitfull Ground*, with the very luxury of the *Trees*, will incorporate, and grow together. Which ſeemeth to me the likelieſt Meanes, that hath been propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*, which, while it is in Motion, doth better *Vnite*. 479

Experiments in Conſort touching the *Sympathy* and *Antipathy* of *Plants*.

There are many Ancient and Received Traditions and Obſervations, touching the *Sympathy* and *Antipathy* of *Plants*; For that ſome will thrive beſt growing neare others; which they impute to *Sympathy*: And ſome worſe; which they impute to *Antipathy*. But theſe are Idle and Ignorant Conceits; And forſake the true *Indication* of the *Cauſes*; As the moſt Part of *Experiments*, that concern *Sympathies* and *Antipathies* doe. For as to *Plants*; neither is there any ſuch Secret *Friendſhip*, or *Hatred*, as they imagine; And if we ſhould be content to call it *Sympathy*, and *Antipathy*, it is utterly miſtaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Whereſoever one *Plant* draweth ſuch a particular Juyce out of the Earth, as it qualifieth the Earth; So as that Iuyce which remaineth is fit for the other Plant, there the Neighbourhood doth good; Becauſe the Nouriſhments are contrary, or ſeverall: But where two *Plants* draw (much) the ſame Juyce, there the Neighbourhood hurteth; For the one deceiveth the other.

First, therefore, all *Plants* that doe draw much *Nouriſhment* from the *Earth* and ſo ſoake the Earth, and exhauſt it, hurt all things that grow by them; As Great *Trees*, (eſpecially *Aſhes*,) and ſuch *Trees*, as ſpread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* onely; But it is an Enemy to any other *Plant*; Becauſe it draweth ſtrongly the fatteſt Juyce of the Earth. And if it be true, that the *Vine*, when it creepeth neare the *Colewort*, will turne away; This may be, becauſe there it findeth worſe Nouriſhment; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nouriſheth. 480

481 Where *Plants* are of ſeverall Natures, and draw ſeverall Juyces out of the Earth, there (as hath been ſaid) the One ſet by the other helpeth: As it is ſet down by divers of the Ancients, that *Rew* doth proſper much, and becommeth ſtronger, if it be ſet by a *Figge-Tree*: Which (we conceive) is cauſed, Not by Reaſon of *Friendſhip*, but by *Extraction* of a contrary Juyces: The one Drawing *Juyce* fit to reſult Sweet, the other bitter. So they have ſet down likewiſe, that a *Roſe* ſet by *Garlick* is ſweeter: Which likewiſe may be, becauſe the more Fetide Juyce of the Earth goeth into the *Garlicke*; And the more Odorate into the *Roſe*.

482 This wee ſee manifeſtly, that there be certain *Corn-Flowers*, which come ſeldome or never in other places, unleſſe they be ſet; But onely amongſt Corne: As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitory*. Neither can this be, by Reaſon of the Culture of the Ground, by Plowing or Furrowing; As ſome *Herbs* and *Flowers* will grow but in *Ditches* new Caſt; For if the *Ground* lie fallow, and unſowne, they will not come: So as it ſhould ſeem to be the *Corne*, that qualifieth the Earth, and prepareth it for their Growth.

483 This Obſervation, if it holdeth, (as it is very probable,) is of great uſe, for the *Meliorating* of *Taſte* in *Fruits*, and *Eſculent Herbs*; And of the *Sent* of *Flowers*. For I do not doubt, but if the *Figge-Tree* doe make the *Rew* more ſtrong, and bitter, (as the Ancients have noted,) good ſtore of *Rew* planted about the *Figg-Tree*, will make the *Figge* more ſweet. Now the *Taſtes* that doe moſt offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*, *Harriſh*, *Sowre*, and *Watriſh*, or *Flaſhy*. It were good therefore to make the *Trials* following.

484 Take *Wormewood*, or *Rew*, and ſet it neare *Lettuce*, or *Coleflory*, or *Artichoake*; And ſee whether the *Lettuce*, or the *Coleflorie*, &c. become not the ſweeter.

485 Take a *Service Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which we know have *Fruits* of harſh and binding Iuyce, and ſet them neare a *Vine* or *Figge-Tree*, and ſee whether the *Grapes* or *Figgs*, will not be the ſweeter.

486 Take *Cucumbers*, or *Pumpions*, and ſet them (here and there) amongſt *Muſk-Melons*, and ſee whether the *Melons* wil not be more Winy, and better taſted. Set *Cucumbers* (likewiſe) amongſt *Radiſh*, and ſee whether the *Radiſh* will not be made the more Biting.

487 Take *Sorrell*, and ſet it amongſt *Raſps*, and ſee whether the *Raſps* will not be the ſweeter.

488 Take *Common Briar*, and ſet it amongſt *Violets*, or *Wall-Flowers*, and ſee whether it will not make the *Violets*, or *Wall-Flowers* ſweeter, and leſſe earthy in their Smell. So ſet *Lettuce*, or *Cucumbers*, amongſt *Roſemary*, or *Bayes*, and ſee whether the *Roſemary*, or *Bayes*, will not be the more Odorate, or Aromaticall.

489 Contrariwiſe, you muſt take heed how you ſet *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Roſemary* will leeſe in Sweetneſſe, if it be ſet with *Lavender*, or *Bayes*, or the like. But yet, if you will correct the ſtrength of an Herbe, you ſhall do well to ſet other like Herbs by him, to take him downe; And if you would ſet *Tanſey* by *Angelica*, it may bee, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you ſhould ſet *Rew* by *Common Wormwood*, it may bee, the *Wormwood* would turne to be liker *Roman Wormwood*.

490 This *Axiome* is of large extent; And therefore would be ſevered, and refined by *Tryall*. Neither muſt you expect to have a *Groſſe Difference* by this kinde of Culture, but only *Further Perfection*.

Triall

Triall would be alſo made in *Herbs*, *Poyſonous*, and *Purgative*, whoſe ill Qualitie (perhaps) may be diſcharged, or attempred, by Setting ſtronger *Poyſons*, or *Purgatives*, by them. 491

It is reported, that the *Shrub* called *Our Ladies Seale*, (which is a Kinde of *Briony*,) and *Coleworts*, ſet near together, one or both will die. The *Cauſe* is, for that they be both great Depredatours of the Earth, and one of them ſtarveth the other. The like is ſaid of *Reed*, and a *Brake*; Both which are ſucculent; And therefore the One deceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw ſtrong Juyces. 492

Some of the Ancients, and likewiſe divers of the Moderne Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sun*, *Moone*, and ſome Principall *Starres*; And certain *Herbs*, and *Plants*. And ſo they have denominated ſome *Herbs Solar*, and ſome *Lunar*; And ſuch like Toyes put into great Words. It is manifeſt, that there are ſome *Flowers*, that have *Reſpect* to the *Sunne*, in two *Kinds*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed moſt *Flowers*, doe open or ſpread their Leaves abroad, when the *Sunne* ſhineth ſerene and fair: And again, (in ſome part,) cloſe them, or gather them inward, either toward Night, or when the Skie is overcaſt. Of this there needeth no ſuch Solemne Reaſon to be aſſigned, As to ſay, that they rejoyce at the preſence of the Sunne; And mourne at the abſence thereof. For it is Nothing elſe, but a little loading of the Leaves, and Swelling them at the Bottome, with the Moiſture of the Aire; whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Clover* will hide the *Stalke*, when the *Sunne* ſheweth bright; Which is nothing but a full Expanſion of the leaves. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Marigolds*; *Wart-wort*; *Mallow Flowers*; and others. The *Cauſe* is ſomewhat more Obſcure than the former; But I take it to be no other; But that the Part againſt which the *Sunne* beateth, waxeth more faint and flaccide in the Stalke: And thereby leſſe able to ſupport the *Flower*. 493

What a little *Moiſture* will doe in *Vegetables*, even though they be dead, and ſevered from the earth, apeareth well in the *Experiment* of *Juglers*. They take the *Beard* of an *Oate*; which (if you marke it well, is wreathed at the Bottome, and one ſmooth entire Straw at the Top. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* halfe the Breadth of a Finger in length. Then they make a little *Croſſe* of a *Quill*, longwayes of that part of the *Quill*, which hath the Pith; And Croſſe-wayes of that Peece of the *Quill* without Pith: The whole Croſſe being the Breadth of a Finger high. Then they pricke the Bottome where the Pith is, and thereinto they put the *Oaten beard*, leaving half of it ſticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if ſomewhat in the Box did work the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Croſſe* ſinke downe, but to ſtick. Then likewiſe by way of Impoſture, they make a Queſtion; As, who is the faireſt Woman in the Company? Or, Who hath a Glove, or Card? And cauſe Another to name divers Perſons: And upon every Naming, they ſtick the Croſſe in the Box, having firſt put it towards their Mouth, as if they charmed it; And the *Croſſe* ſtirreth not; But when they come to the Perſon that they would take; As they hold the *Croſſe* to their Mouth, they touch the *Beard* with the Tip of their Tongue, and wet it; And ſo ſtick the *Croſſe* in the Box; And then you ſhall ſee it turn finely 494

and

and ſoftly, three or foure Turnes; Which is cauſed by the untwining of the *Beard* by the Moiſture. You may ſee it more evidently, if you ſticke the Croſſe between your fingers, in ſtead of the Box; And therefore you may ſee, that this Motion, which is Effected by ſo little Wet, is ſtronger than the Cloſing or Bending of the Head of a *Marigold*.

495 It is reported by ſome, that the *Herbe* called *Roſa-Solis*, (whereof they make Strong Waters,) will at the Noon-day, when the *Sunne* ſhineth hot and bright, have a great Dew upon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the Sunne. Men favour Wonders. It were good firſt to be ſure, that the Dew that is found upon it, be not the Dew of the Morning Preſerved, when the Dew of other *Herbs* is breathed away; For it hath a ſmooth and thick Leaf, that doth not diſcharge the Dew ſo ſoone, as other *Herbs* that are more Spungy and Porous. And it may be Purſlane, or ſome other Herbe, doth the like, and is not marked. But if it be ſo, that it hath more Dew at Noon than in the Morning, then ſure it ſeemeth to be an Exudation of the *Herb* it ſelfe. As Plummes ſweat when they are ſet into the Oven: for you wil not (I hope) thinke, that it is like *Gedeons Fleece* of *Wooll*, that the *Dew* ſhould fall upon that, and no where elſe.

496 It is certaine, that the *Honey-dews* are found more upon *Oake leaves*, than upon *Aſh*, or *Beech*, or the like: But whether any *Cauſe* be from the *Leafe* it ſelfe, to concoct the Dew; Or whether it be onely, that the *Leafe* is Cloſe and Smooth; (And therefore drinketh not in the Dew, but preſerveth it;) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but upon certain *Herbs* or *Leaves* onely. *Flowers* that have deep *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*,) *Lillies*, and the like. And in them certainly the *Flower* beareth part with the *Dew*.

497 The Experience is, that the *Froth*, which they call *Woodeſare*, (being like a kinde of Spittle,) is found but upon certain *Herbs*, and thoſe hot Ones; As *Lavander*, *Lavender-cotton*, *Sage*, *Hyſſope*, &c. Of the *Cauſe* of this enquire further; For it ſeemeth a Secret. There falleth alſo *Mildew* upon *Corn*, and ſmutteth it; But it may be, that the ſame falleth alſo upon other *Herbs*, and is not obſerved.

498 It were good, Triall were made, whether the great Conſent betweene *Plants* and *Water*, which is a principall Nouriſhment of them, will make an *Attraction* or Diſtance, and not at Touch onely. Therefore take a *Veſſell*, and in the middle of it make a falſe Bottome of courſe Canvaſſe: Fill it with Earth above the Canvaſſe, and let not the Earth be watred; Then ſow ſome good *Seeds* in that Earth; But under the Canvaſſe, ſome halfe a foot in the Bottome of the Veſſell, lay a great *Spunge*, thorowly wet in Water; And let it lye ſome ten Dayes; And ſee whether the *Seeds* will ſprout, and the *Earth* become more Moiſt, and the *Spunge* more drie. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of VVater, is farre ſtranger than this.

Experiments in Conſort, touching the *Making Herbs* and *Fruits Medicinable*.

499 THe *Altering* of the *Sent*, *Colour*, or *Taſte* of *Fruit*, by *Infuſing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herbe*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Subſtance, are but *Fancies*. The *Cauſe* is, for that thoſe Things have paſſed their Period, and nouriſh not: And all *Alteration* of Vegetables, in thoſe Qualities, muſt be by ſomewhat that is apt to go into the Nouriſhment of the *Plant*. But this is true, that where *Kine* feed upon

Wilde

Wilde Garlicke, their *Milke* tasted plainely of the *Garlicke*: And the Flesh of *Muttons* is better tasted where the *Sheepe* feed upon *Wild Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth upon certaine *Herbs*; And *Honey* in *Spain* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Maiden* that was fed with *Napellus*, (which is counted the Strongest poyson of all *Vegetables*) which with use did not hurt the *Maid*, but poysoned some that had Carnall Company with her. So it is observed by some, that there is a vertuous *Bezoar*, and another without vertue; Which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth upon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleys, where no such *Herbs* are. Thus farre I am of Opinion; That as Steeped Wines and Beers, are very *Medicinall*; And likewise Bread tempred with divers Powders; So of *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Egges*,) that they may be made of great use for *Medicine*, & *Diet*, if the *Beast*, *Foul*, or *Fish*, be fed with a speciall kinde of food, fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may be applyed unto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Juyce, Which is hardly capable of any speciall Quality, untill the *Plant* do assimilate it.

But lest our Incredulitie may prejudice any profitable Operations in this kinde (especially since Many of the Ancients have set them downe,) Wee thinke good briefly to propound the four *Meanes*, which they have devised of Making *Plants Medicinable*. The first is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it up againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides it is a long time in Going up, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*; Which is somewhat better: For if any Vertue be received from the *Medicine*, it hath the lesse way, and the lesse time to goe up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, wherein the *Medicine* is *Infused*; Which I have little Opinion of, because the *Seed* (I doubt,) will not draw the Parts of the *Matter*, which have the *Proprety*: But it wil be farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant oft*, with an *Infusion* of the *Medicine*. This, in one respect may have more force than the rest; Breause the *Medicaton* is oft renewed; Whereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborn to receive those fine *Impressions*; And besides, (as I have said before,) they have a great *Hill* to goe up. I judge therefore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in *severall places*, *one above the other*; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*. And the *Watring* of those *Lumps* of *Dung*, with Squirts of an *Infusion* of the *Medicine* in *Dunged Water*, once in three or foure Dayes. 500

NATV-

NATURALL HISTORIE.

VI Century.

OVR *Experiments* wee take care to be, (as wee have often ſaid,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vſe*, or of *Diſcovery*: For wee hate *Impoſtures*; And deſpiſe *Curioſities*. Yet becauſe wee muſt apply our Selves ſomewhat to Others, wee will ſet downe ſome *Curioſities* touching *Plants*.

Experiments in Conſort touching *Curioſities* about *Fruits* and *Plants*.

It is a *Curioſitie* to have *ſeverall Fruits* upon *one Tree*; And the more, when ſome of them come *Earely*, and ſome come *Late*; So that you may have, upon the ſame *Tree*, Ripe *Fruits* all Sommer. This is eaſily done, by Grafting of ſeverall *Cions*, upon ſeverall Boughes, of a Stocke, in a good Ground, plentifully fed. So you may have all Kindes of *Cherries*, and all Kindes of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diverſitie* of *Fruits* muſt be ſuch, as will graft upon the ſame Stock. And therefore I doubt, whether you can have *Apples*, or *Peares*, or *Orenges*, upon the ſame Stock, upon which you graft *Plums*. 501

It is a *Curioſity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is eaſily performed by Moulding them, when the *Fruit* is young, with Mouſds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long as a Cane; Or as round as a Sphere; Or formed like a Croſſe. You may have alſo *Apples*, in the forme of *Peares*, or *Limons*. You may have alſo *Fruit* in more Accurate Figures; As we ſaid of *Men*, *Beaſts*, or *Birds*, according as you make the Moulds. Wherein you muſt underſtand, that you make the Mould big enough, to containe the whole *Fruit*, when it is grown to the greateſt: For elſe you will choake the Spreading of the *Fruit*; Which otherwiſe would ſpread it ſelfe, and fill the Concave, and ſo to be turned into the *Shape* deſired; As it is in Mould workes of Liquid things. Some doubt may be conceived, 502

ceived, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Covered. *Quære* alſo, whether ſome ſmall Holes, may not be made in the Wood, to let in the Sunne. And note, that it were beſt to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curioſity*, to have *Inſcriptions*, or *Engravings*, in *Fruit*, or *Trees*. This is eaſily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, ſo the Letters will grow more large, and Graphicall.

——*Teneriſque meos incidere Amores*
Arboribus, creſcent illæ, creſcetis Amores.

504 You may have *Trees apparelled* with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth holpen* with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wild-Thyme*, *Camomill*, and ſuch like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with ſome Feeding from the *Trees*. It would bee tried alſo with *Shoots* of *Vines*, and *Roots* of *Red-Roſes*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it ſelfe.

505 It is an ordinary *Curioſity*, to *Form Trees* and *Shrubs*, (as *Roſemary*, *Juniper*, and the like,) into *Sundry Shapes*; VVhich is done by Moulding them within, and Cutting them without. But they are but lame Things, being too ſmall to keepe Figure: Great *Caſtles* made of *Trees* upon Frames of Timber, with Turrets, and Arches, were anciently matters of Magnificence.

506 Amongſt *Curioſities*, I ſhall place *Colouration*, though it be ſomewhat better: For *Beauty* in *Flowers* is their Preheminence. It is obſerved by ſome, that *Gilly-Flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watered, nor New Moulded, nor Tranſplanted, will turn *White*. And it is probable, that the *White*, with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* commeth of Scarcity of Nouriſhment; Except in Flowers that are onely *White*, and admit no other *Colours*.

507 It is good therefore, to ſee what *Natures* doe accompany what *Colours*; For by that you ſhall have Light, how to induce *Colours*, by Producing thoſe *Natures*. *Whites* are more Inodorate, (for the moſt part,) than *Flowers* of the ſame kinde *Coloured*; As is found in *Single White Violets*, *White-Roſes*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. We finde alſo, that *Bloſſomes* of *Trees* that are *White*, are commonly Inodorate; As *Cherries*, *Peares*, *Plums*; Whereas thoſe of *Apples*, *Crabbs*, *Almonds*, and *Peaches*, are Bluſhy, and Smell ſweet. The *Cauſe* is, For that the Subſtance that Maketh the *Flower*, is of the thinneſt and fineſt of the *Plant*; Which alſo maketh *Flowers* to be of ſo dainty *Colours*. And if it be too Sparing, and Thinne, it attaineth no Strength of Odour; Except it be in ſuch *Plants*, as are very Succulent; VVhereby they need rather to be ſcanted in their Nouriſhment, than repleniſhed, to have them ſweet. As wee ſee in *White Satyrion*, which is of a Dainty Smell; And in *Bean-Flowers*, &c. And againe, if the *Plant* be of Nature, to put forth *White Flowers* onely, and thoſe not thinne, or drie, they are commonly of rancke and fulſome Smell; As *May-Flowers*, and *White Lillies*.

508 Contrariwiſe, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taſte, than the *Coloured*; As wee ſee in *White Grapes*; In *White Reſpes*; In *White Strawberries*; In *White Currans*, &c. The *Cauſe* is, for that the

the *Coloured* are more juyced, and courser juyced; And therefore not so well and equally Concocted; But the *White* are better proportioned to the Disgestion of the *Plant*.

But in *Fruits*, the *white* commonly is meaner; As in *Peare-Plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberrie*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *white*. The *Harvest White-Plumme*, is a base *Plumme*; And the *Verdoccio* and *white Date-Plumme*, are no very good *Plmmes*. The *Cause* is, for that they are all Overwatry: Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste, And therefore all your dainty *Plmmes*, are a little drie, and come from the Stone; As the *Muskle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to be *Blacke*, are of the Nature of *Berries*, sweetest such as are Paler; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more sowre. 509

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Clove-Gilly-Flower* which is the most Common;) And sow it; And there will come up *Gilly-Flowers*, some of one *Colour*, and some of another, casually; as the *Seed* meeteth with Nourishment in the Earth; So that the *Gardiners* finde, that they may have two or three *Roots* amongst an hundred, that are rare, and of great Price; As *Purple*, *Carnation* of severall *Stripes*; The *Cause* is, (no doubt,) that in *Earth*, though it be contiguous, and in one Bed, there are very severall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which do come up *Purple*, doe alwayes come up Single; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leafe*. This *Experiment* of severall *Colours*, comming up from one *Seed*, would bee tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppey*, and *Hollioke*. 510

Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Mulberries* likewise; and *Grapes*, though most toward the Skin. There is a *Peach* also, that hath a Circle of *Red* towards the Stone: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, not *Warden*, nor *Plumme*, nor *Apricot*, although they have (many times) *Red* sides, are Coloured *Red* within. The *Cause* may be enquired. 511

The generall *Colour* of *Plants* is *Greene*, which is a *Colour* that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murry*, or *Reddish*; And they be commonly *Young Leaves* that doe so. As it is in *Oakes*, and *Vines*, and *Hasle*. *Leaves* rot into a *Yellow*; And some *Hollies* have part of their *Leaves Yellow*, that are, (to all seeming,) as Fresh and Shining, as the *Greene*. I suppose also, that *Yellow* is a lesse Succulent *Colour*, than *Greene*: And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand ever towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Bloud-Red*, Stalke and Leafe, and all; As *Amaranthus*. Some *Herbes* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some have *White Leaves*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure* and a *Fair Purple*, are never found in *Leaves*. This sheweth that *Flowers* are made of a refined Juyce of the Earth; And so are *Fruits*: But *Leaves* of a more Course, and Common. 512

It is a *Curiosity* also to make *Flowers Double*; Which is effected by *Often Removing* them into *New Earth*; As on the contrary Part, *Double Flowers*, 513

by neglecting, and not Removing, prove *Single*. And the Way to cure it ſpeedily, is to ſow or ſet *Seeds*, or *Slips* of *Flowers*, And as ſoone as they come up, to remove them into new Ground, that is good. Enquire alſo, whether *Inoculating* of *Flowers*, (as *Stock Gilly-Flowers*, *Roſes*, *Muſk-Roſes*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double bloſſomes*: But that *Tree* beareth no *Fruit*; And, it may be, that the ſame Meanes, which applyed to the *Tree*, doth extremely accelerate the Sap to riſe, and Breake forth; Would make the *Tree* ſpend it ſelfe in *Flowers*, and thoſe to become *Double*; Which were a great pleaſure to ſee; Eſpecially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that have *Bloſſomes Bluſh-Coloured*.

514 The *Making* of *Fruits* without *Core* or *Stone*, is likewiſe a *Curioſitie*; And ſomewhat better: Becauſe whatſoever maketh them ſo, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be ſet in the Ground, have the *Pith* finely taken forth; (and not altogether, but ſome of it left, the better to ſave the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is ſaid to be, of dividing a *Quick-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it up againe.

515 It is reported alſo, that a *Citron* grafted upon a *Quince*, will have ſmall or no *Seeds*; And it is very probable, that any *Sowre-Fruit* grafted upon a *Stocke*, that beareth a *Sweeter Fruit*, may both make the *Fruit*, ſweeter, and more void of the harſh Matter of *Kernels*, or *Seeds*,

516 It is reported, that not onely the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from Riſing in the Middeſt, and *Turning* it to riſe on the Outſide, will make the *Fruit* without *Core*, or *Stone*; As if you ſhould bore a *Tree* cleane thorow, and put a wedge in. It is true, there is ſome Affinitie betweene the *Pith* and the *Kernell*, becauſe they are both of a harſh Subſtance, and both placed in the Middeſt.

517 It is reported, that *Trees watred* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the Rule is generall, that whatſoever will make a *Wilde-Tree*, a *Garden-Tree*, will make a *Garden-Tree* to have leſſe *Core*, or *Stone*.

Experiments in Conſort, touching the *Degenerating* of *Plants*; And of the *Tranſmutation* of them, one into another.

THe Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baſer in the ſame Kinde; And ſometimes ſo farre, as to change into another Kinde. 1. The *Standing long*, and not being *Removed*, maketh them *degenerate*. 2. *Drought*, unleſſe the Earth of it ſelfe bee moiſt, doth the like. 3. So doth *Removing into worſe Earth*, or *Forbearing to compoſt the Earth*; As wee ſee that *Water-Mint* turneth into *Fjeld Mint*; And the *Colewort* into *Rape* by Neglect, &c.

518 Whatſoever *Fruit* uſeth to be ſet upon a *Root*, or a *Slip*, if it be *ſowne*, will
519 *degenerate*. *Grapes ſowne*, *Figs*, *Almonds*, *Pomgranate Kernels ſowne*, make the *Fruits degenerate*, and become Wilde. And againe, Moſt of thoſe *Fruits* that uſe to be *grafted*, if they be ſet of *Kernels*, or *Stones*, *degenerate*. It is true, that *Peaches*, (as hath beene touched before,) doe better upon *Stones Set*, than upon *Grafting*: And the Rule of Exception ſhould ſeeme to be this; That whatſoever *Plant* requireth much Moiſture, proſpereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the Stocke, though it giveth a finer Nouriſhment, yet it giveth a ſcanter, than the Earth at large.

520 *Seeds*, if they bee very *Old*, and yet have ſtrength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilfull Gardiners make trial of the *Seeds*, before they buy them, whether they be good or no, by Putting them

them in Water gently Boyled; And if they bee good, they will ſprout within halfe an Houre.

521 It is ſtrange which is reported, that *Baſill* too much expoſed to the *Sunne*, doth turne into *Wilde Time*: Although thoſe two *Herbs* ſeeme to have ſmall Affinity; but *Baſill* is almoſt the onely Hot *Herbe*, that hath Fat and Succulent *Leaves*; Which Oylineſſe, if it be drawne forth by the Sunne, it is like it will make a very great Change.

522 There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *Wild Vines*: Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it ſelfe.

523 It is not impoſſible, and I have heard it verified, that upon *Cutting downe* of an Old *Timber-Tree*, the *Stub* hath put out ſometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it be true, the *Cauſe* may be, for that the old *Stub* is too ſcant of Juyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of ſmaller kinde, that needeth leſſe Nouriſhment

524 There is an Opinion in the Country, that if the ſame *Ground* be *oft ſwoen*, with the *Graine* that *grew upon it*, it will, in the end, grow to bee of a baſer kinde.

525 It is certaine, that in *Sterile Yeares*, *Corne ſowne* will grow to an *Other Kinde*.

Grandia ſæpè quibus mandavimus Hordea Sulcis,
Infœlix Lolium, & ſteriles dominantur Avenæ.

And generally it is a Rule, that *Plants* that are brought forth by *Culture*, as *Corne*, will ſooner change into other *Species*, than thoſe that come of themſelves: For that *Culture* giveth but an Adventitious Nature, which is more eaſily put off.

This worke of the *Tranſmutation* of *Plants*, one into another, is *inter Magnalia Naturæ*: For the *Tranſmutation* of *Species* is, in the vulgar philoſophy, pronounced Impoſſible: And certainly it is a thing of difficultie, and requireth deep Search into Nature: But ſeeing there appeare ſome manifeſt *Inſtances* of it, the Opinion of Impoſſibilitie is to bee rejected; And the meanes thereof to be found out. Wee ſee, that in *Living Creatures*, that come of *Putrefaction*, there is much *Tranſmutation*, of one into another; As *Caterpillers* turne into *Flies*, &c. And it ſhould ſeeme probable, that whatſoever *Creature*, having life, is generated without *Seed*, that *Creature* will change out of one *Species* in another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as we may well conclude, that ſeeing the Earth, of it ſelfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well have a *Tranſmigration* of *Species*. Wherefore wanting *Inſtances*, which doe occurre, wee ſhall give Directions of the moſt likely *Tryalls*: And generally, we would not have thoſe,

that read this Worke of *Sylva Sylvarum*, account it ſtrange, or thinke that it is an Over-Haſte, that wee have ſet down Particulars untried; For contrariwiſe, in our owne Eſtimation, wee account ſuch Particulars, more worthy, than thoſe that are already tried and knowne. For theſe Later muſt be taken as you finde them; But the other doe levell Point blank at the *Inventing* of *Cauſes*, and *Axiomes*.

526 Firſt, therefore you muſt make account, that if you will have one *Plant* change into another, you muſt have the *Nouriſhment* over-rule the *Seed*: And therefore you are to practiſe it by *Nouriſhments* as contrary, as may bee, to the *Nature* of the *Herbe*; So nevertheleſs as the *Herb* may grow, And likewiſe with Seeds that are of the Weakeſt Sort, and have leaſt Vigour. You ſhall doe well therefore, to take *Marſh-Herbs*, and Plant them upon Tops of Hills, and Champaignes; And ſuch *Plants* as require much Moiſture, upon Sandie and very drie Grounds. As for Example, *Marſh-Mallows*, and *Sedge*, upon Hills; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, upon a *Sandy Plot*: So contrariwiſe plant *Buſhes*, *Heath*, *Ling*, & *Brakes* upon a *Wet* or *Marſh Ground*. This I conceive alſo, that all *Eſculent* & *Garden Herbs*, ſet upon the Tops of Hils, will prove more *Medicinall*, though leſſe *Eſculent*, than they were before. And it may be likewiſe, ſome *Wild Herbs* you may make *Sallet Herbs*. This is the firſt Rule for *Tranſmutation* of *Plants*.

527 The ſecond Rule ſhall bee to bury ſome few *Seeds*, of the *Herb* you would change, amongſt other *Seeds*; And then you ſhall ſee, whether the Juyce of thoſe other *Seeds* doe not ſo qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parſly-Seed* amongſt *Onion-Seed*; Or *Lettuce Seed* amongſt *Parſly Seed*; Or *Baſill-Seed* amongſt *Thyme-Seed*; And ſee the Change of Taſte, or otherwiſe. But you ſhall do well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forain *Seed*.

528 The third Rule ſhall be, the making of ſome *Medley* or *Mixture* of *Earth*, with ſome other *Plants Bruiſed*, or *Shaven*, either in *Leaf* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort Leaves* ſtamped, and ſet in it *Artichoakes*, or *Parſnips*; So take *Earth* made with *Marjoram*, or *Origanum*, or *Wild-Thyme*, bruiſed, or ſtamped, and ſet in it *Fennell-Seed*, &c. In which Operation, the Proces of Nature ſtill will be, (as I conceive,) not that the *Herbe* you worke upon, ſhould draw the Juyce of the Forrain *Herbe*; (For that opinion we have formerly rejected;) But there will be a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herb*.

529 The fourth Rule ſhall be, to mark what *Herbs*, *ſome Earths doe put forth of themſelves*; And to take that *Earth*, and to *Pot* it, or to *Veſſell* it; And in that to ſet the *Seed* you would change: As for Example, take from under Walls, or the like, where *Nettles* put forth in abundance, the Earth which you ſhall there finde, without any *String*, or *Root* of the *Nettles*; And Pot that *Earth*, and ſet in it *Stock-gilly-flowers*, or *Wall-flowers*, &c. Or ſow in the *Seeds* of them; And ſee what the Event will be: Or take *Earth*, that you have prepared to put forth *Muſhromes*, of it ſelfe, (whereof you ſhall finde ſome *Inſtances* following;) And ſow it in *Purſlane-Seed*, or *Lettuce-Seed*, for in theſe *Experiments*, it is likely enough, that the *Earth* being accuſtomed to ſend forth one Kinde of Nouriſhment, will alter the new *Seed*.

The

The fifth Rule ſhall be, to make the *Herb grow contrary* to his *Nature*; As to make *Ground-Herbs* riſe in *Height*: As for example; Carry *Camomile*, or *Wild-Thyme*, or the *Green Strawberry*, upon Sticks, as you doe *Hops* upon Poles; And ſee what the Event will be. 530

The ſixth Rule ſhall be to make *Plants grow out of the Sunne, or open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell up *Earth*, and ſow ſome *Seed* in it, and put it in the Bottome of a Pond; Or put it in ſome great hollow *Tree*; Trie alſo the Sowing of *Seeds* in the Bottomes of Caves; And Pots with Seeds ſowne, hanged up in Wels, ſome diſtance from the Water, and ſee what the event will be. 531

Experiments in Conſort touching the *Procerity*, and *Lowneſſe*, and *Artificiall warping* of *Trees*.

IT is certaine, that *Timber-Trees* in *Coppice Woods*, grow more upright, and more free from Under Boughs, than thoſe that ſtand in the *Fields*: The *Cauſe* whereof is, for that *Plants* have a Naturall Motion, to get to the Sunne; And beſides, they are not glutted with too much Nouriſhment; For that the *Coppice* ſhareth with them; And Repletion ever hindereth Stature; Laſtly, they are kept warm; And that ever in *Plants* helpeth Mounting. 532

Trees, that are, of themſelves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gums*,) as *Firrs*, and *Pines*, mount of themſelves in Heighth without Side-Boughs, till they come towards the Top. The *Cauſe* is, partly Heat; And partly Tenuity of Juyce; Both which ſend the Sap upwards. As for *Juniper*, it is but a *Shrub*, and groweth not bigge enough in Body, to maintaine a tall *Tree*. 533

It is reported, that a Good Strong *Canvas*; ſpread over a *Tree* grafted low, ſoone after it putteth forth, will *dwarfe* it, and make it ſpread. The *Cauſe* is plain; For that all Things that grow, will grow as they find Room. 534

Trees are generally ſet of *Roots*, or *Kernels*; But if you ſet them of *Slips*, (as of ſome *Trees* you may, by name the *Mulberry*,) ſome of the *Slips* will take; And thoſe that take, (as is reported) will be *Dwarf-Trees*. The *Cauſe* is, for that a *Slip* draweth Nouriſhment more weakly, than either a *Root*, or *Kernell*. 535

All *Plants* that put forth their *Sap* haſtily, have their Bodies not proportionable to their Length; And therefore they are *Winders* and *Creepers*; As *Ivy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a ſlow Putting forth, and leſſe Vigour of Mounting. 536

Experiments in Conſort, touching the Rudiments of *Plants*, and of the Excreſcences of *Plants*, or *Super-Plants*.

The *Scripture* ſaith, that *Salomon* wrote a *Naturall Hiſtory*: from the *Cedar* of *Libanus*, to the *Moſſe growing upon the Wall*: For ſo the beſt *Tranſlations* have it. And it is true that *Moſſe* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Moſſe groweth chiefly upon *Ridges* of *Houſes*, tiled or thatched; And upon the *Creſts* of *Walls*. And that *Moſſe* is of a lightſome and pleaſant Green. The Growing upon *Slopes* is cauſed, for that *Moſſe*, as on the one ſide it commeth of Moiſture and water, ſo on the other ſide the *Water* muſt but Slide, and not ſtand or Poole. And the *Growing* upon *Tiles*, or *Walls*, &c. is cauſed, for that thoſe dried Earths, having not Moiſture ſufficient to put forth a *Plant*, doe practiſe *Germination* by Putting forth *Moſſe*: Though when by Age, or otherwiſe, they grow to relent and reſolve, they 337

ſometimes put forth *Plants*; As *Wall-Flowers*. And almoſt all *Moſſe* hath here and there little Stalkes, beſides the low Thrumme.

538 *Moſſe* groweth upon *Alleyes*, eſpecially ſuch as lie Cold, and upon the North; As in divers Tarraſſes: And againe, if they be much troddon; Or if they were at the firſt, gravelled; For whereſoever *Plants* are kept downe, the Earth putteth forth *Moſſe*.

539 *Old Ground*, that hath been long unbroken up, gathereth *Moſſe*: And therefore Husbandmen uſe to cure their *Paſture Grounds*, when they grow to *Moſſe*, by Tilling them for a yeare, or two: Which alſo dependeth upon the ſame *Cauſe*; For that the more Sparing and Starving Juyce of the Earth, inſufficient for *Plants*, doth breed *Moſſe*.

540 *Old Trees* are more *Moſſie*, (farre) than *Young*; For that the Sap is not ſo franke as to riſe all to the Boughes, but tyreth by the Way, and putteth out *Moſſe*.

541 *Fountaines* have *Moſſe* growing upon the *Ground* about them; *Muſcoſi Fontes*; ——————

The *Cauſe* is for that the *Fountaines* draine the *Water* from the *Ground Adjacent*, and leave but ſufficient Moiſture to breed *Moſſe*: And beſides, the *Coldneſſe* of the *Water* conduceth to the ſame.

542 The *Moſſe* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is Excerned, and doth not Aſſimilate. And upon great *Trees* the *Moſſe* gathereth a Figure, like a *Leaſe*.

543 The *Moiſter Sort* of *Trees* yeeld little *Moſſe*; As we ſee in *Aſps*, *Poplars*, *Willows*, *Beeches*, &c. Which is partly cauſed for the Reaſon that hath been given, of the franeke Putting up of the *Sap* into the *Boughes*; And partly, for that the *Barks* of thoſe *Trees*, are more Cloſe, and Smooth, than thoſe of *Oakes*, and *Aſhes*; Whereby the *Moſſe* can the hardlier iſſue out.

544 In *Clay-Grounds*, all *Fruit-Trees* grow full of *Moſſe*, both upon *Body* and *Boughes*; Which is cauſed, partly by the *Coldneſſe* of the *Ground*, whereby the *Plants* nouriſh leſſe; And partly by the *Toughneſſe* of the *Earth*, whereby the *Sap* is ſhut in, and cannot get up, to ſpread ſo franckly, as it ſhould doe.

545 We have ſaid heretofore, that if *Trees* be *Hide-bound*, they wax leſſe Fruitfull, and gather *Moſſe*: And that they are holpen by *Hacking*, &c. And therefore by the Reaſon of Contraries, if *Trees* bee bound in with *Cords*, or ſome Outward *Bands*, they will put forth more *Moſſe*: Which (I thinke) happeneth to *Trees* that ſtand Bleake, and upon the Cold Winds. It would alſo be tried, whether, if you cover a *Tree*, ſomewhat thick upon the top, after his Powling, it will not gather more *Moſſe*. I thinke alſo, the *Watring* of *Trees* with *Cold Fountaine Water*, will make them grow full of *Moſſe*.

546 There is a *Moſſe* the *Perfumers* have, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quere* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* ſake, being a Thing of Price, I have ſet down the laſt *Experiments*, how to multiply, and call on *Moſſes*.

Next unto *Moſſe*, I will ſpeake of *Muſhromes*; VVhich are likewiſe an *Vnperfect Plant*. The *Muſhromes* have two ſtrange *Properties*; The One, that they yeeld ſo *Delicious* a *Meat*; The other, that they *come up* ſo *haſtily*, As in a *Night*, and yet they are *Vnſowne*. And therefore ſuch as are Vpſtarts in State, they call

call, in reproach, *Muſhromes*. It muſt needs bee therefore, that they be made of much *Moyſture*; And that *Moiſture* Fat, Groſſe, and yet ſomwhat Concocted. And (indeed) wee finde, that *Muſhromes* cauſe the *Accident*, which wee call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Empoyſon. And this ſheweth, that they are VVindy; And that Windineſſe is Groſſe, and Swelling; Not Sharp, or Griping. And upon the ſame reaſon *Muſhromes* are a venereous Meat.

547 It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moiſteſt of *Trees*,) cut ſmall, and caſt into *Furrowes* well dunged, will cauſe the Ground to put forth *Muſhromes*, at all *Seaſons* of the *Year*, fit to be eaten. Some adde to the Mixture *Leaven* of *Bread*, reſolved in *Water*.

548 It is reported, that if a *Hilly-Field*, where the *Stubble* is ſtanding, be ſet on *Fire*, in the *Showry Seaſon*, it will put forth great Store of *Muſhromes*.

549 It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth up *Muſhromes*. And we know that *Harts-Horne* is of a Fat and Clammie Subſtance: And it may bee *Oxe-Horne* would doe the like.

550 It hath beene reported, though it be ſcarce credible, that *Ivy* hath growne out of a *Stags-Horne*; which they ſuppoſe did rather come from a *Confrication* of the *Horne* upon the *Ivy*, than from the *Horne* it ſelfe. There is not knowne any Subſtance, but *Earth*, and the *Precedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Moſſe*, or *Herby Subſtance*. There may bee Triall made of ſome *Seeds*, as that *Fennell-Seed*, *Muſtard-Seed*, and *Rape-Seed*, put into ſome little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to ſee if they will grow.

551 There is alſo another *Vnperfect Plant*, that (in ſhew) is like a great *Muſhrome*: And it is ſometimes as broad as ones Hat; Which they call a *Troads-Stoole*: But it is not Eſculent; And it groweth (commonly) by a dead Stub of a *Tree*; And likewiſe about the *Roots* of *Rotten-Trees*: And therefore ſeemeth to take his Juyce from *Wood Putrified*. Which ſheweth, by the way, that *Wood-Putrified* yeeldeth a franke *Moiſture*.

552 There is a *Cake* that groweth upon the Side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a Cheſnut Colour, and hard, and pithy; Whereby it ſhould ſeeme, that even *Dead Trees* forget not their Putting forth; No more than the *Carcaſſes* of *Mens Bodies* that put forth *Haire*, and *Nailes*, for a Time.

553 There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the firſt is hard like a *Tennis-Ball*, and white; And after groweth of a *Muſhrome Colour*, and full of light *Duſt* upon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corroſive*, and *Fretting Nature*.

554 There is an *Herb* called *Iewes-Eare*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Eſpecially of *Elders*, and ſometimes *Aſhes*. It hath a ſtrange Propertie; For in *warme Water*, it ſwelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is uſed for *Squinanties*, and *Inflammations* in the *Throat*; Whereby it ſeemeth to have a Mollifying, and Lenifying Vertue.

There

555 There is a Kind of *Spongie Excreſcence*, which groweth chiefly upon the *Roots* of the *Laſer-Tree*; And ſometimes upon *Cedar*, and other *Trees*. It is very White, and Light, and Friable: Which we call *Agarick*. It is famous in *Phyſick* for the *Purging* of *Tough flegme*. And it is alſo an excellent *Opener* for the *Liver*: But Offenſive to the *Stomacke*; And in *Taſte* it is, at the firſt, *Sweet* and after *bitter*.

556 We finde no *Super-Plant*, that is a Formed *Plant*, but *Miſſeltoe*. They have an idle Tradition, that there is a *Bird*, called a *Miſſel-Bird*, that feedeth upon a *Seed*, which many times ſhee cannot diſgeſt, and ſo expelleth it whole with her Excrement: which falling upon a *Bow* of a *Tree*, that hath ſome Riſt, putteth forth the *Miſſeltoe*. But this is a Fable; For it is not probable, that *Birds* ſhould feed upon that they cannot diſgeſt. But allow that, yet it cannot be for other Reaſons: For Firſt, it is found but upon certain *Trees*; And thoſe *Trees* beare no ſuch *Fruit*, as may allure that *Bird* to ſit and feed upon them. It may be, that *Bird* feedeth upon the *Miſſeltoe-Berries* and ſo is often found there; Which may have given occaſion to the Tale. But that which maketh an End of the Queſtion, is, that *Miſſeltoe* hath been found to put forth under the *Boughes*, and not (onely) above the *Boughes*: So it cannot be any Thing that falleth upon the *Bough*. *Miſſeltoe* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, ſometimes upon *Haſles*; And rarely upon *Oakes*; The *Miſſeltoe* whereof is counted very *Medicinall*. It is ever greene, Winter and Summer; And beareth a *White Gliſtering Berry*: And it is a *Plant*, utterly differing from the *Plant* upon which it groweth. Two things therefore may be certainly ſet downe: Firſt, that *Super-fatation* muſt be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* muſt be ſuch, as the *Tree* doth excerne, and cannot aſſimilate; For elſe it would goe into a *Bough*; And beſides, it ſeemeth to be more Fat and Unctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Miſſeltoe* may give Light to other Practices. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the *Barke*; And *watring* of the Wound every Day, with *Warme-Water Dunged*, to ſee if it would bring forth *Miſſeltoe*, or any ſuch like Thing. But it were yet more likely to trie it, with ſome other *Watring* or *Anointing*, that were not ſo Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be ſuch Things as kill not the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they bee forbidden to put forth their *Naturall Boughs*: Poll therefore a *Tree*, and cover it, ſome thickneſſe, with *Clay* on the Top; And ſee what it will put forth. I ſuppoſe it will put forth *Roots*; For ſo will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* alſo, the *Tree* would bee cloſed with ſomewhat, that is not ſo Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, ſo it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A Man may count the *Prickles* of *Trees* to be a kinde of *Excreſcence*, For they will never be *Boughes*, nor beare *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, blacke and white; *Brier*; *Roſe*; *Limon-Trees*; *Crab-Trees*; *Gooſe Berry*; *Berbery*; Theſe have it in the *Bough*; The *Plants* that have *Prickles* in the *Leaſe*, are, *Holly*; *Iuniper*; *Whin-buſh*; *Thiſtle*; *Nettles* alſo have a ſmall Venomous *Prickle*; So hath *Borrage*, but harmeleſſe. The *Cauſe* muſt be *Haſtie Putting forth*; *Want* of *Moiſture*; And the *Cloſeneſſe* of the *Barke*; For

the

the *Haſte* of the *Spirit to put forth*, and the *Want* of *Nouriſhment* to put forth a *Bough*, and the *Cloſeneſſe* of the *Barke*, cauſe *Prickles* in *Boughes*; And therefore they are ever like a *Pyramis*, for that the *Moiſture* ſpendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come alſo of *Putting forth more Iuyce* into the *Leafe*, than can ſpread in the *Leafe* ſmooth; and therfore the *Leaves* otherwiſe are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but never *Plaine*, but as it were with *Folds*, for the ſame *Cauſe*.

There be alſo *Plants*, that though they have no *Prickles*, yet they have a Kinde of *Downey* or *Velvet Rine*, upon their *Leaves*; As *Roſe-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Sub ill Spirit*, in a *Soft* or *Fat Subſtance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Roſe-Campions*, ſtamped, have been applyed, (with ſucceſſe,) to the *Wreſts* of thoſe that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a Sanative vertue, towards the *Lungs*; And the *Leafe* alſo is *Healing* in *Surgery*. 560

Another Kinde of *Excreſcence* is an *Exudation* of *Plants*, joyned with *Putrefaction*; As wee ſee in *Oake-Apples*, which are found chiefly upon the *Leaves* of *Oakes*; And the like upon *Willowes*: And Countrey People have a kind of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a Signe of a *Peſtilent Yeare*; Which is a likely Thing, becauſe they grow of Corruption. 561

There is alſo upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Bruſh* of *Moſſe*, of divers Colours; Which if you cut, you ſhall ever finde full of little white *Wormes*. 562

Experiments in Conſort, touching the *Producing* of *Perfect Plants* without *Seed*.

IT is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houſes*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth Sundry Kinds of *Herbs*: But ſome *Time* is required, for the *Germination*; For if it bee taken, but from a *Fathome* deep, it will put forth the *Firſt Yeare*; If much deeper, not till after a *Yeare*, or *Two*. 563

The *Nature* of the *Plants* growing out of *Earth* ſo taken up, doth follow the *Nature* of the *Mould* it ſelf; As if the *Mould* bee *Soft*, and Fine, it putteth forth Soft *Herbs*; As *Graſſe*, *Plantine*, and the like; If the *Earth* bee Harder and Courſer, it putteth forth *Herbs* more *Rough*, as *Thiſtles*, *Firres*, &c. 564

It is Common *Experience*, that where *Alleyes* are cloſe *Garvelled*, the *Earth* putteth forth, the firſt yeare, *Knot-Graſſe*, and after *Spire-Graſſe*. The *Cauſe* is, for that the *Hard Gravell*, or *Pebble* at the firſt Laying, will not ſuffer the *Graſſe* to come forth upright, but turneth it to finde his way where it can; But after that the *Earth* is ſomewhat looſened at the Top, the Ordinary *Graſſe* commeth up. 565

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, ſome depth, and Potted, will put forth *Herbs* of a Fat and Iuicie Subſtance; As *Penny-wort*, *Purſlane*, *Houſleeke*, *Penny royall*, &c. 566

The *Water* alſo doth ſend forth *Plants*, that have no *Roots* fixed in the Bottome; But they are leſſe *Perfect Plants*, being almoſt but *Leaves*, and thoſe Small ones: Such is that we call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme Leafe*, but of a freſher Greene, and putteth forth a little *String* into the *Water*, farre from the *Bottome*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And ſo have a Number of other *Herbs* that grow in *Ponds*. 567

It

568 It is reported by ſome of the *Ancients*, and ſome *Moderne Teſtimonie* likewiſe, that there be ſome *Plants*, that grow upon the Top of the *Sea*; Being ſuppoſed to grow of ſome *Concretion* of *Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* ſtirreth little. As for *Alga Marina*, (*Sea-weed*,) and *Eryngium*, (*Sea-Thiſtle*,) both the *Roots*; but have *Sea-weed* under the *Water*, the *Sea-Thiſtle* but upon the *Shore*.

569 The *Ancients* have noted, that there are ſome *Herbs*, that grow out of *Snow*, laid up cloſe together, and *Putrified*; And that they are all *Bitter*; And they name one eſpecially, *Flomus*, which we call *Moth-Mullein*. It is certain, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewiſe put forth *Plants*.

570 The *Ancients* have affirmed, that there are ſome *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* have beene found in the Middle of a Free-Stone. We ſee alſo, that *Flints*, lying above *Ground*, gather *Moſſe*; And *Wall-Flowers*, and ſome other *Flowers*, grow upon *Walls*; But whether upon the Maine *Bricke*, or *Stone*, or whether out of the *Lime*, or *Chincks*, is not well obſerved; For *Elders* and *Aſhes* have beene ſeene to grow out of *Steeples*: But they manifeſtly grow out of *Clefts*; In ſo much as when they grow bigge, they will diſ-joyne the *Stone*. And beſides, it is doubtfull, whether the *Mortar* it ſelfe putteth it forth, or whether ſome *Seeds* be not let fall by *Birds*. There be likewiſe *Rock-Herbs*; But I ſuppoſe thoſe are, where there is ſome *Mould* or *Earth*. It hath likewiſe been found, that great *Trees* growing upon *Quarries*, have put downe their *Root* into the *Stone*.

571 In ſome *Mines* in *Germany*, as is reported, there grow in the Bottome *Vegetables*; And the *Worke-Folks* uſe to ſay, they have *Magicall Vertue*; And will not ſuffer men to gather them.

572 The *Sea-Sands* ſeldome beare *Plants*. Whereof the *Cauſe* is yeelded, by ſome of the *Ancients*, for that the *Sunne* exhaleth the *Moiſture*, before it can incorporate with the *Earth*, and yeeld a *Nouriſhment* for the *Plant*. And it is affirmed alſo, that Sand hath (alwayes) his *Root* in *Clay*; And that there be no Veines of *Sand*, any great depth within the *Earth*.

573 It is certaine, that ſome *Plants* put forth for a time, of their owne *Store*, without any *Nouriſhment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment* 29.

Experiments in Conſort, touching *Forraine Plants*.

IT is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballaſt* of *Ships*, caſt upon ſome *Grounds* in *Italy*, did put forth *Forraine Herbs*, to us in *Europe* not knowne; And, that which is more, that of their *Roots*, *Barks*, and *Seeds*, contuſed together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other.

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575 *Plants* brought out of *Hot Countries*, will endeavour to put forth, at the ſame *Time*, that they uſually doe in their owne *Climate*; And therefore to preſerve them, there is no more required, than to keep them from the Injury of Putting back by *Cold*. It is reported alſo, that *Graine* out of the *Hotter Countries* tranſlated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Country*. It is likely, that this will prove better in *Graines*, than it *Trees*; For that *Graines* are but *Annuall*; And ſo the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embaſed by the *Ground*, to which it is Removed.

576 Many *Plants*, which grow in the *Hotter Countries*, being ſet in the *Colder*,

der, will nevertheleſſe, even in thoſe *Cold Countries*, being ſowne of *Seeds* late in the *Spring*, come up and abide moſt part of the *Summer*; As wee finde it in *Orenge*, and *Limon-Seeds*, &c. The *Seeds* whereof ſowne in the End of *April*, will bring forth excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be ſowne, would doe the like.

Experiments in Conſort, touching the *Seaſons* in which *Plants* come forth.

577 THere be ſome *Flowers*, *Bloſſomes*, *Graines*, and *Fruits*, which come more *Early*; And others which come more *Late* in the Yeare. The *Flowers* that come early, with us, are, *Prime-Roſes*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and ſome early *Tulippa's*. And they are all *Cold Plants*, Which therefore, (as it ſhould ſeeme,) have a quicker *Perception* of the *Heat* of the *Sunne* Increaſing, than the *Hot Herbs* have; As a *Cold Hand* will ſooner finde a little *Warmth*, than a *Hot*. And thoſe that come next after, are *Wall-Flowers*, *Cowſlips*, *Hyacinths*, *Roſe-mary-Flowers*, &c. And after them, *Pincks*, *Roſes*, *Flowerdeluces*, &c, and the lateſt are *Gilly-Flowers*, *Holly-Oakes*, *Larkes-Foot*, &c. The Earlieſt *Bloſſomes* are, the *Bloſſomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of ſuch *Trees*, as have much *Moiſture*, either *Watry*, or *Oily*. And therefore *Crocus Vernus* alſo, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For thoſe alſo finde the *Sunne* ſooner than the *Drier Trees*. The *Graines* are, firſt *Rie* and *Wheat*; Then *Oats* and *Barley*; Then *Peaſe* and *Beanes*. For though Greene *Peaſe* and *Beanes* be eaten ſooner, yet the Dire Ones, that are uſed for *Horſe-Meate*, are ripe laſt; And it ſeemeth that the Fatter *Graine* commeth firſt. The Earlieſt *Fruits* are, *Strawberries*, *Cherries*, *Gooſeberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Raſps*; And after them, *Damaſins*, and moſt Kinde of *Plums*, *Peaches*, &c. And the lateſt are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-berries*, *Heps*, *Medlars*, *Services*, *Cornelians*, &c.

578 It is to be noted, that (commonly) *Trees* that *ripen lateſt*, *Bloſſome ſooneſt*: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it ſeemeth to be a Worke of Providence, that they bloſſome ſo ſoone; For otherwiſe, they could not have the *Sunne* long enough to ripen.

579 There be Fruits, (but rarely,) that come *twice* a *Yeare*; as ſome *Peares*, *Strawberries*, &c. And it ſeemeth they are ſuch as abound with Nouriſhment; Whereby after one Period, before the *Sunne* waxeth too weake, they can endure another. The *Violet* alſo, amongſt *Flowers*, commeth twice a Yeare; Eſpecially the *Double White*; And that alſo is a *Plant* full of Moiſture. *Roſes* come twice, but it is not without *Cutting*, as hath beene formerly ſaid.

580 In *Muſcovia*, though the *Corne* come not up, till late *Spring*, yet their *Harveſt* is as Early as Ours. The *Cauſe* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee ſee with us, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after thoſe kinde of *Winters* likewiſe, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the ſame time; Which troubleth the *Husbandman* many times; For you ſhall have *Red-Roſes*, and *Damaſke Roſes*, come together; And likewiſe the *Harveſt* of *Wheat* and *Barley*. But this happeneth ever, for that the Earlier ſtayeth for the Later; And not that the Later commeth ſooner.

581 There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Bloſſomes*, and *Young Fruit*, and *Ripe Fruit*, almoſt all the Yeare, ſucceeding one another. And it is ſaid, the *Orenge* hath the like with us, for a great Part of Summer;

Summer; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to have so: But thereither they want *Iuyce* to spend; Or they meet with the *Cold* of the Winter: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582 Some *Herbs* are but *Annuall*, and die, *Root* and all, once a Yeare; As *Borrage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tabacco*, *Mustard-Seed*, and all kindes of *Corne*; Some continue many Yeares; As *Hyssope*, *Germander*, *Lavender*, *Fennell*, &c. The *Cause* of the *Dying* is *double*; The first is the *Tenderneſſe* and *Weakneſſe* of the *Seed*, which maketh the Period in a ſmall time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of theſe are Hot. The other *Cauſe* is, for that ſome *Herbs* can worſe endure *Cold*, As *Baſill*, *Tobacco*, *Muſtard-Seed*. And theſe have (all) much *Heat*.

Experiments in Comfort, touching the *Laſting* of *Herbs* and *Trees*.

583 THe *Laſting* of *Plants* is moſt in thoſe that are *Largeſt* of *Body*; As *Oakes*, *Elme*, *Cheſ-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Coleworts*, *Pompions*, which are *Herbs* of the *Largeſt Size*, are of ſmall Durance; Whereas *Hyſſope*, *Winter-Savory*, *Germander*, *Thyme*, *Sage*, will laſt long. The *Cauſe* is, for that *Trees* laſt according to the *Strength*, and *Quantity* of their *Sap* and *Iuyce*; Being well munited by their *Barke* againſt the Injuries of the *Aire*: But *Herbs* draw a Weak *Iuyce*; And have a ſoft *Stalke*; And therefore thoſe amongſt them which laſt longeſt, are *Herbs* of *Strong Smell*, and with a *Stiukie Stalke*.

584 *Trees* that beare *Maſt*, and *Nuts*, are commonly more laſting, than thoſe that beare *Fruits*; Eſpecially the *Moiſter Fruits*: As *Oakes*, *Beeches*, *Cheſnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. laſt longer than *Apples*, *Peares*, *Plums*, &c. The *Cauſe* is the *Parcneſſe* and *Oyleneſſe* of the *Sap*; Which ever waſteth leſſe, than the more *Watry*.

585 *Trees* that bring forth their *Leaves* late in the *Yeare*, and caſt them likewiſe late, are more *laſting*, than thoſe that ſprout their Leaves Early, or ſhed them betimes. The *Cauſe* is, for that the late *Comming forth* ſheweth a *Moiſture* more fixed; And the other looſe, and more eaſily reſolved. And the the ſame *Cauſe* is, that *Wilde-Trees* laſt longer than *Garden-Trees*; And in the ſame Kinde, theſe whoſe *Fruit* is Acide, more than thoſe whoſe *Fruit* is *Sweet*.

586 Nothing procureth the *Laſting* of *Trees*, *Buſhes*, and *Herbs*, ſo much, as often *Cutting*: For every *Cutting* cauſeth a Renovation of the *Iuyce* of the *Plant*; That it neither goeth ſo farre, nor riſeth ſo faintly, as when the *Plant* is not *Cut*: Inſomuch as *Annuall Plants*, if you cut them ſeaſonably, and will ſpare the uſe of them, and ſuffer them to come up ſtill young, will laſt more Yeares than one; As hath beene partly touched; Such as is *Lettuce*, *Purſlane*, *Cucumber*, and the like. And for *Great Trees*, we ſee almoſt all *Overgrowne Trees*, in Church-yards, or neare Ancient Building, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height.

587 Some *Experiment* would be made, how by *Art* to make *Plants* more *Laſting*, than their ordinary Period: As to make a *Stalke* of *Wheate*, &c. laſt a whole yeare. You muſt ever preſuppoſe, that you handle it ſo, as the *Winter* killeth it not; For we ſpeake onely of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatſoever maketh the *Herbe* come later, than at his time, will make it laſt longer time: It were good to try it, in a *Stalke* of *Wheat*, &c. ſet in the Shade, and encompaſſed with a Caſe of *Wood*, not touching the *Straw*, to keep out open *Aire*.

588 *And for the Preſervation of Fruits, and Plants, as well upon the Tree, or Stalk,*

as gathered, we shall handle it under the Title *of* Conservation *of* Bodies.

THe *Particular Figures* of *Plants* we leave to their *Descriptions*; But some few Things, in generall, we will observe. *Trees* and *Herbs*, in the Growing forth of their *Boughs*, and *Branches*, are not *Figured*, and keepe no Order. The *Cause* is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth casually, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sollow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Peare-Tree*, (which the *Criticks* will have to borrow his name of πῦρ, *Fire*,) *Orenge-Trees*, *Firre-Trees*, *Service-Trees*, *Lime-Trees*, &c. And some are more spread and broad; As *Beeches*, *Hornebeame*, &c. The rest are more indifferent. The *Cause* or Scattering the *Boughes*, is the Hasty breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but Branch near the *Ground*. The *Cause* of the *Pyramis*, is the Keeping in of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The *Spreading* is caused by the *Carrying* up of the *Sap*, plentifully, without Expence; And then putting it forth speedily, and at once.

Experiments in Consort, touching the severall *Figures* of *Plants*. 588

There be divers *Herbs*, but no *Trees*, that may be said to have some kinde of Order, in the Putting forth of their *Leaves*: For they have *Joynts*, or *Knuckles*, as it were Stops in their *Germination*; As have *Gilly-Flowers*, *Pinks*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cause* whereof is, for that the *Sap* ascendeth unequally, and doth (as it were) tire and stop by the way. And it seemeth, they have some *Closenesse*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going up, untill it hath gathered into a Knot; and so is more urged to put forth. And therefore, they are most of them hollow, when the *Stalke* is drie: As *Fennell-Stalke*, *Stubble*, and *Canes*. 589

Flowers have (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Foure*; As in *Prime-Roses*, *Bryer-Roses*, *Single-Musk-Roses*, *Single-Pinks*, and *Gilly-Flowers*, &c, which have five *Leaves*: *Lillies*, *Flower-de-luces*, *Borage*, *Bugloss*, &c. which have four *Leaves*. But some put forth *Leaves* not Numbred; But they are ever small Ones; As *Mary-Golds*, *Trifoile*, &c. We see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the Five *Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* also are all *Figured*; Some Round; Some Long; None Square; and many jagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Jagging* of *Pinks*, and *Gilly-Flowers*, to be like the inequality of *Oak-Leaves*, or *Vine-Leaves*, or the like; But they seldome or never have any small *Purles*. 590

OF *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaves* before their *Blossoms*; as *Apples*, *Pears*, *Plums*, *Cherries*, *White-Thorn*, &c. The *Cause* is, for that those, that put forth their *Blossomes* first, have either an Acute and *Sharp Spirit*; (And therefore commonly they all put forth early in the Spring, and ripen very late; As most of the Particulars before mentioned;) Or else an *Oylie Juyce*, which is apter to put out *Flowers*, than *Leaves*.

Experiments in Consort, touching some *Principall Differences* in *Plants*. 591.

Of *Plants*, some are *Green* all *Winter*; Others cast their *Leaves*. There are *Green* all *Winter*, *Holly*, *Ivy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Juniper*, *Bayes*, *Rose-Mary*, &c. The *Cause* of the Holding *Green*, is the Close and Compact *Sub-* 592

ſtance of their *Leaves*, and the *Pedicles* of them. And the *Cauſe* of that again, is either the *Tough* and *Viſcous Juyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the firſt Sort is *Holly*; Which is of ſo *Viſcous* a *Juyce*, as they make *Birdlime* of the *Barke* of it. The *Stalke* of *Ivy* is Tough, and not Fragile, as we ſee in other ſmall Twigs drie. *Firre* yeeldeth *Pitch*. *Box* is a fatt and heavy *Wood*, as we ſee it in *Boules*. *Eugh* is a Strong and Tough *Wood*, as we ſee it in *Bowes*. Of the Second Sort is *Juniper*, which is a *Wood* Odorate, and maketh a hot Fire. *Bayes* is like-wiſe a Hot and Aromaticall *Wood*; And ſo is *Roſe-Mary* for a *Shrub*. As for the *Leaves*, their Denſity appeareth, in that, either they are Smooth and Shining, as in *Bayes*, *Holly*, *Ivy*, *Box*, &c. Or in that they are Hard and Spirie, as in the reſt. And Triall would be made of *Grafting* of *Roſe-Mary*, and *Bayes*, and *Box*, upon a *Holly-Stocke*; Becauſe they are *Plants* that come all *Winter*. It were good to trie it alſo with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde Trees*; To ſee whether they will not yeeld their *Fruit*; or beare their *Leaves*, later, and longer in the *Winter*; becauſe the *Sap* of the *Holly* putteth forth moſt in the *Winter*. It may be alſo a *Mezerion-Tree*, grafted upon a *Holly*, will prove both an Earlier, and a Greater *Tree*.

593 There be ſome *Plants*, that bear no *Flower*, and yet beare *Fruit*: There be ſome, that beare *Flowers*, and no *Fruit*: There be ſome, that beare neither *Flowers*, nor *Fruit*. Moſt of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewiſe) of the *Fruit-Trees*; As *Mulberry*, *Walnut*, &c. And ſome *Shrubs*, (as *Juniper*, *Holly*, &c.) beare no *Flowers*. Divers *Herbs* alſo beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Purſlane*, &c. Thoſe that beare *Flowers*, and no *Fruit*, are few; As the *Double Cherry*, the *Sallow*, &c. But for the *Cherry*, it is doubtfull, whether it be not by Art, or Culture; For if it be by Art, then Triall would be made, whether *Apples*, and other *Fruits Bloſſomes*, may not be doubled. There are ſome Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

594 There be ſome *Plants*, that ſhoot ſtill upwards, and can *Support* themſelves; As the greateſt Part of *Trees*, and *Plants*: There be ſome Other, that *Creep* along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot ſupport themſelves; As *Vines*, *Ivy*, *Bryar*, *Briony*, *Wood-bines*, *Hop's*, *Climatis*, *Camomill*, &c. The *Cauſe* is, (as hath been partly touched,) for that all *Plants*, (naturally) move upwards; But if the *Sap* put up too faſt, it maketh a ſlender *Stalke*, which will not ſupport the weight: And therefore theſe latter Sort are all Swift and Haſtie Commers.

Experiments in Conſort, touching all Manner of *Compoſts*, and *Helps*, of *Ground*.

THe firſt and moſt Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the beſt; And next, the *Dung* of *Kine*: And thirdly, that of *Horſes*; Which is held to be ſomewhat too hot, unleſſe it be mingled. That of *Pigeons* for a Garden, as a ſmall Quantity of Ground, Excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to ſpread it immediately before the *Ploughing* and *Sowing*; And ſo to *Plough* it in: For if you ſpread it long before, the *Sunne* will draw out much of the *Fatneſſe* of the *Dung*: If the *Ground* be *Grazing Ground*; to ſpread it ſomewhat late, towards *Winter*; That the *Sunne* may have the leſſe Power to drie it up. As for ſpeciall *Compoſts* for *Gardens*, (as a *Hot Bed*, &c.) we have handled them before.

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596 The Second *Kind* of *Compoſt*, is, the *Spreading* of divers *Kinds* of *Earth*, As *Marle*, *Chalke*, *Sea-Sand*, *Earth* upon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the beſt; As having moſt *Fatneſſe*. And not

Heating

Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a ſpeciall Vertue, by the *Salt*: For *Salt* is the firſt Radiment of life. *Chalke* over-heateth the *Ground* a little. And therefore is beſt upon *Cold Clay-Grounds*, or *Moiſt Grounds*: But I heard a great *Husband* ſay, that it was a common Errour, to thinke that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Graſſe*, as well as *Corne*: but that which breedeth the Errour is, becauſe after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Reſt; And then (indeed) afterwards it will beare little *Graſſe*, becauſe the *Ground* is tyred out. It were good to trie the laying of *Chalke* upon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it muſt be Friable firſt, by Raine, or Lying: As for *Earth*, it *Compaſſeth* it Selfe: For I knew a *Great Garden*, that had a *Field* (in a manner) powred upon it; And it did beare *Fruit* exceedingly the firſt yeare of the Planting: For the *Surface* of the *Earth* is ever the Fruitfulleſt. And *Earth* ſo prepared hath a double *Surface*. But it is true, as I conceive, that ſuch *Earth* as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to haſten the *Breeding* of *Salt-Petre*, is to forbid the Sunne, and the Growth of *Vegetables*. And therefore, if you make a large Hovell, thatched, over ſome Quantity of Ground; Nay, if you doe but Planck the Ground over; it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a very good *Compoſt*; Eſpecially if the *Pond* have been long uncleanſed, and ſo the *Water* be not too Hungry: And I judge it will be yet better, if there be ſome *Mixture* of *Chalke*.

597 The Third *Helpe* of *Ground*, is, by ſome other *Subſtances*, that have a Vertue to make *Ground* Fertile; though they be not meerly *Earth*: wherein *Aſhes* excell; In ſo much as the Countries about *Ætna*, and *Veſuvius*, have a kinde of Amends made them, for the Miſchiefe the Eruptions (many times) doe, by the exceeding *Fruitfulneſſe* of the *Soile*, cauſed by the *Aſhes*, ſcattered about. *Soot* alſo, though thinne, ſpred in a *Field* or *Garden*, is tried to be a very good *Compoſt*. For *Salt*, it is too Coſtly: But it is tried, that mingled with *Seed Corne*, and ſowen together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all over. As for the *Steeping* of the *Seeds*, in ſeverall *Mixtures* with *Water*, to give them Vigour; Or *Watring Grounds* with *Compoſt-Water*; We have ſpoken of them before.

598 The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables to die into the Ground*; And ſo to Fatten it; As the *Stubble* of *Corne*, Eſpecially *Peaſe*. *Brakes* caſt upon the *Ground*, in the beginning of *Winter*, will make it very Fruitfull. It were good (alſo) to trie, whether *Leaves* of *Trees* ſwept together, with ſome *Chalke* and *Dung* mixed, to give them more Heart, would not make a good *Compoſt*: For there is nothing loſt, ſo much as *Leaves* of *Trees*; And as they lie ſcattered, and without Mixture, they rather make the *Ground* ſoure, than otherwiſe.

599 The Fifth *Help* of *Ground*, is *Heat* and *Warmth*. It hath been anciently practiſed to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, upon the *Ground*: We ſee, that *Warmth* of *Wals* and *Encloſures*, mendeth *Ground*: We ſee alſo that *Lying open* to the *South*, mendeth *Ground*: We ſee againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *Compoſt*: And it may be doubted, whether the *Covering* of the *Ground* with *Braks*, in the Beginning of the *Winter*, (whereof we ſpake in the laſt *Experiment*,) helpeth it not, by reaſon of the *Warmth*. Nay ſome very good

Husbands doe ſuſpect, that the *Gathering* up of *Flints*, in *Flinty Ground*, and Laying them on *Heaps*, (which is much uſed,) is no good *Husbandry*; For that they would keepe the *Ground* Warme.

600 The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting* out *Waters*, at ſeaſonable Times: For *Water*, at ſome Seaſons, and with reaſonable ſtay, doth good; But at ſome other Seaſons, and with too long Stay, doth hurt. And this ſerveth onely for *Meadowes*, which are along ſome *River*. The other way is, to bring *Water*, from ſome *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in ſome long *Furrowes*; And from thoſe *Furrowes*, drawing it traverſe to ſpread the *Water*. And this maketh an excellent Improvement, both for *Corne*, and *Graſſe*. It is the richer, if thoſe *Hanging Grounds* be fruitfull, becauſe it waſheth off ſome of the Fatneſſe of the *Earth*: But howſoever it profiteth much. Generally, where there are great Over flowes, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cauſe* may be, for that it keepeth the *Ground* warme, and nouriſheth it: But the *Fen-Men* hold, that the *Sewers* muſt be kept ſo, as the *Water* may not ſtay too long in the *Spring*, till the *Weeds* and *Sedge* be growne up; For then the *Ground* will be like a Wood, which keepeth out the Sunne; And ſo continueth the Wet; Whereby it will never graze (to purpoſe) that yeare. Thus much for *Irrigation*. But For *Avoidances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, we ſhall ſpeake of them in another Place.

NATU-

NATURALL HISTORY

VII Century.

THe *Differences* between *Animate* and *Inanimate Bodies*, we ſhall handle fully under the *Title* of *Life*, and *Living Spirits*, and *Powers*. We ſhall therefore make but a briefe Mention of them in this Place. The Maine *Differences* are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts* within them: But the Maine *Differences* between *Animate* and *Inanimate*, are two: The firſt is, that the *Spirits* of *Things Animate*, are all *Continued* with themſelves, and are *Branched* in *Veines*, and ſecret *Canales*, as *Blood* is: And in *Living Creatures*, the *Spirits* have not onely *Branches*, but certaine *Cels* or *Seats*, where the *Principall Spirits* doe reſide, and whereunto the reſt doe reſort: But the *Spirits* in *Things Inanimate* are ſhut in, and cut off by the *Tangible Parts*; And are not pervious one to another; As *Aire* is in *Snow*. The ſecond Maine *Difference* is, that the *Spirits* of *Animate Bodies* are all in ſome degree, (more or leſſe,) kindled and inflamed; And have a fine *Commixture* of *Flame*, and an *Aëriall Subſtance*. But *Inanimate Bodies* have their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* conſiſteth not in the *Heat* or *Coolneſſe* of *Spirits*; For *Cloves* and other *Spices*, *Naptha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deale than *Oile*, *Waxe*, or *Tallow*, &c.) but not *Inflamed*. And when any of thoſe Weake and Temperate *Bodies* come to bee Inflamed, then they gather a much greater *Heat*, than others have *Un-inflamed*; beſides their *Light*, and *Motion*, &c.

Experiments in Conſort, touching the *Affinities*, and *Differences*, between *Plants* and *Inanimate Bodies*.

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The *Differences*, which are *Secondary*, and proceed from theſe two *Radicall Differences*, are; Firſt, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it ſelfe; So farre goeth the *Shape*, or *Figure*; And then is *Determined*. Secondly, *Plants* doe nouriſh; *Inanimate Bodies* doe not: They have ah *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period* of *Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succeſſion*, and *propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

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603 The *Differences* between *Plants*, and *Metals* or *Fossiles*, besides those foure before mentioned, (for *Metals* I hold Inanimate,) are these: First, *Metals* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604 There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metals* both; *Coral* is one of the Neareſt of both *Kindes*: Another is *Vitriol*, for that is apteſt to ſprout with *Moiſture*.

605 Another ſpeciall *Affinity* is between *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it diſſolve not in *Arefaction*) will in the end iſſue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Moſſe*, and *Muſhromes* and *Agaricke*, and other of thoſe kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Fleſh*, and *Fiſh*, and *Plants* themſelves, and a Number of other things, after a *Mouldineſs*, or *Rottenneſs*, or *Corrupting*, they will fal to breed *Wormes*. Theſe *Putrefactions*, which have *Affinity* with *Plants*, have this *Difference* from them; That they have no *Succeſſion* or *Propagation*, though they *Nouriſh*, and have a *Period* of *Life*, and have likewiſe ſome *Figure*.

606 I left once, by chance, a *Citron* cut, in a cloſe Roome, for three Summermoneths, that I was abſent; And at my Return, there were grown forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would have been ſome *Herbe*.

Experiments in Conſort, ſhewing the Affinities, and Differences, of *Plants*, and *Living Creatures*. And the *Confines* and *Participles* of them.

THe *Affinities* and *Differences* between *Plants* and *Living Creatures*, are theſe that follow. They have both of them *Spirits Continued* and *Branched*, and alſo *Inflamed*: But firſt in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was alſo formerly ſaid. And ſecondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And theſe two are the *Radicall Differences*. For the *Secondary Differences*, They are, as follow. Firſt, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are ſevered, and of themſelves. Secondly, *Living Creatures* have *Locall Motion*; *Plants* have not. Thirdly, *Living Creatures* nouriſh from their *Upper Parts*, by the *Mouth* chiefly; *Plants* nouriſh from below, namely from the *Rootes*. Fourthly, *Plants* have their *Seed* and *Seminall Parts* uppermoſt; *Living Creatures* have them lowermoſt: And therefore it was ſaid, not elegantly alone, but Philoſophically; *Homo eſt Planta inverſa*; *Mans like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* have a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* have more *Diverſity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* have. Seventhly, *Living Creatures* have *Senſe*, which *Plants* have not. Eighthly, *Living Creatures* have *Voluntary Motion*, which *Plants* have not.

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608 For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name diſtinguiſhed; As *Male-Piony*, *Female-Piony*; *Male-Roſe-mary*, *Female-Roſe-mary*; *Hee-Holly*, *Shee-Holly*, &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The neareſt Approach of it, is between the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neare, incline the one to the other: In ſo much as, (that which is more ſtrange,) they doubt not to report, that to keep the *Trees* upright from Bending, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enjoyed by the *Contact* of a *Middle Body*. But this may be Faigned, or at leaſt Amplified. Nevertheleſſe, I am apt enough to thinke, that this ſame *Binarium* of a

Stronger

Stronger and a Weaker, like unto *Maſculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded ſometimes; As in ſome *Creatures* of *Putrefaction*, wherein no *Marks* of *Diſtinction* appeare: and it is doubled ſometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in moſt *Species*.

The *Participles* or *Conſiners* between *Plants* and *Living Creatures*, are ſuch chiefly, as are *Fixed*, and have no *Locall Motion* of *Remove*, though they have a *Motion* in their *Parts*; Such as are *Oyſters*, *Cockles*, and ſuch like. There is a Fabulous Narration, that in the *Northern Countries*, there ſhould be an *Herb* that groweth in the likeneſs of a *Lambe*, and feedeth upon the *Graſſe*, in ſuch ſort, as it will bear the *Graſſe* round about. But I ſuppoſe that the *Figure* maketh the *Fable*; For ſo we ſee, there be *Bee-Flowers*, &c. And as for the *Graſſe*, it ſeemeth the *Plant*, having a great *Stalke*, and *Top*, doth prey upon the *Graſſe* a good way about, by drawing the *Juyce* of the *Earth* from it.

The *Indian Fig* boweth his *Roots* down ſo low, in one year, as of it ſelfe it taketh *Root* again: And ſo multiplyeth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cauſe* is, the *Plenty* of the *Sap*, and the *Softneſs* of the *Stalk*, which maketh the *Bough*, being overloaden, and not ſtiffely upheld, weigh down. It hath *Leaves*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cauſe* is, for that the continuall Shade increaſeth the *Leaves*, and abateth the *Fruit*; which nevertheleſs is of a pleaſant Taſte. And that (no doubt) is cauſed, by the *Suppleneſs* and *Gentleneſs* of the Juyce of that *Plant*, being that which maketh the *Boughs* alſo ſo Flexible.

Experiments *Promiſcuous* touching *Plants*.

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It is reported by one of the *Ancients*, that there is a certain *Indian Tree*, having few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit* being of good Taſte, groweth out of the *Barke*. It may be, there be *Plants* that pour out the *Sap* ſo faſt, as they have no leiſure, either to divide into many *Leaves*, or to put forth *Stalks* to the *Fruit*. With us *Trees* generally have ſmal *Leaves* in compariſon. The *Fig* hath the greateſt; And next it the *Vine*, *Mulberie*, and *Sycamore*; And the leaſt are thoſe of the *Willow*, *Birch*, and *Thorn*. But there be found *Herbs* with far greater *Leaves* than any *Tree*; As the *Bur*, *Gourd*, *Cucumber*, and *Colewort*. The *Cauſe* is, (like to that of the *Indian Fig*) the haſty and plentiful Putting forth of the *Sap*.

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There be three *Things* in uſe for *Sweetneſs*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was ſcarce known, and little uſed. It is found in *Canes*: *Quære*, whether to the firſt *Knuckle*, or further up? And whether the very *Bark* of the *Cane* it ſelf do yeeld *Sugar* or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I have heard from one, that was induſtrious in Husbandry, that the labour of the *Bee* is about the *Waxe*; And that hee hath known in the beginning of *May*, *Honey-Combes* empty of *Honey*; And within a fortnight when the ſweet *Dewes* fall, filled like a *Cellar*. It is reported by ſome of the *Ancients*, that there is a Tree called *Occhus*, in the Valleys of *Hyrcania*, that diſtilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Tears* of ſome *Trees*, may be ſweet. It may be alſo, that ſome ſweet Juyces, fit for many uſes, may bee concocted out of *Fruits*: to the Thickneſs of *Honey*, or perhaps of *Sugar*; The likeſt are *Raiſins* of the Sun, *Figs* and *Corrans*. The Meanes may be enquired.

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The *Ancients* report of a *Tree*, by the *Perſian Sea*, upon the *Shore-Sands*, which

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which is nouriſhed with the *Salt-Water*; And when the *Tide* ebbeth, you ſhall ſee the *Roots*, as it were, bare without *Bark*, (being as it ſeemeth corroded by the *Salt*,) and graſping the *Sands* like a *Crab*; Which nevertheleſſe beareth a *Fruit*. It were good to try ſome *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by ſetting them within the *Sands*.

614 There bee of *Plants*, which they uſe for *Garments*, theſe that follow. *Hemp*, *Flaxe*, *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*,) *Sericum*, which is a *Growing Silk*; They make alſo *Cables* of the *Bark* of *Lime-Trees*. It is the *Stalk* that maketh the *Filaceous* Matter, commonly; And ſometimes the *Down* that groweth above.

615 They have, in ſome *Countries*, a *Plant* of a *Roſie-Colour*, which ſhutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noon*; which the *Inhabitants* of thoſe *Countries* ſay, is a *Plant* that *Sleepeth*. There be *Sleepers* enough then; For almoſt all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that have a *Moſsie* or *Downie Root*; And likewiſe that have a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches*, and *Impoſtours* make an ugly *Image*, giving it the Form of a *Face* at the *Top* of the *Root*, and leave thoſe *Strings* to make a broad *Beard* down to the Foot. Alſo there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-footed-Doves* foot. So as you may ſee, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirſute Roots*. And, I take it, in the *Bulbous*, the Sap haſteneth moſt to the Aire, and Sun: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirſute* is a Middle between both; That beſides the Putting forth upwards, and downwards, putteth forth in Round.

617 There are ſome *Tears* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, eſpecially in the Mornings, the Dew being on, the *Tear* commeth forth, and hangeth upon their *Beards*: Of this Sort is ſome kinde of *Ladanum*.

618 The *Irrigation* of the *Plane-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewiſe with *Roots*; For upon *Seeds* it worketh no great Effects.

619 The way to carry *Forrain Roots*, a long Way, is, to veſſell them cloſe in *Earthen Veſſels*. But if the *Veſſels* be not very Great, you muſt make ſome Holes in the Bottome, to give ſome Refreſhment to the *Roots*; Which otherwiſe (as it ſeemeth,) will decay, and ſuffocate.

620 The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryeſt, And thoſe Things, which are known to comfort other *Plants*, did make that more Sterill: For in *Showers* it proſpered worſt: It grew alſo amongſt *Buſhes* of other kindes, where commonly *Plants* do not thrive: Neither did it love the Sun: There might be one *Cauſe* of all thoſe Effects; Namely, the ſparing Nouriſhment, which that *Plant* required. *Quare*, how far *Caſſia*; which is now the Subſtitute of *Cinnamon*, doth participate of theſe Things.

621 It is reported by one of the *Ancients*, that *Caſsia*, when it is gathered, is put into the *Skins* of *Beaſts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe devour the *Pith* and *Marrow* of it, and ſo make it Hollow. But Meddle not with the *Bark*, becauſe to them it is bitter.

622 There were, in Ancient Time, *Vines*, of farr greater *Bodies*, then we know any; For there have been *Cups* made of them, and an *Image* of *Jupiter*. But it is like they were *Wilde-Vines*; For the *Vines* that they uſe for *Wine*, are ſo often

often Cut, and ſo much Digged and Dreſſed, that their Sap ſpendeth into the *Grapes*, and ſo the *Stalke* cannot increaſe much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is ſtrange, though no *Tree* hath the *Twiggs*, while they are green, ſo brittle, yet the *Wood* dried is extream Tough; And was uſed by the *Captains* of *Armies* amongſt the *Romans*, for their *Cudgels*.

It is reported, that in ſome Places, *Vines* are ſuffered to grow like *Herbs*, ſpreading upon the *Ground*; And that the *Grapes* of thoſe *Vines* are very great. It were good to make triall, whether *Plants* that uſe to be born up by Props, will put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Ivie*, *Woodbine*, &c. 623

Quinces, or *Apples*, &c. if you will keep them long, drown them in *Honey*; But becauſe *Honey* (perhaps) will give them a Taſte Overluſhious, it were good to make Triall in *Powder* of *Sugar*; Or in *Syrrup* of *Wine* only Boyled to Height. Both theſe would likewiſe be tried in *Orenges*, *Limons*, and *Pomegranats*; For the *Powder* of *Sugar*, and *Syrrup* of *Wine*, will ſerve for times more than once. 624

The *Conſervation* of *Fruit* would be alſo tried in *Veſſels*, filled with *Fine*, *Sand*, or with *Powder* of *Chalke*; Or in *Meal* and *Flower*; Or in *Duſt* of *Oakwood*; Or in *Mill*. 625

Such *Fruits*, as you appoint for *Long-Keeping*, you muſt gather before they bee full *Ripe*; And in a *Fair* and *Dry Day*, towards *Noon*; And when the *Winde* bloweth not *South*; And when the *Moon* is under the *Earth*; And in *Decreaſe*. 626

Take *Grapes*, and hang them in an *Empty Veſſell*, well Stopped; and ſet the *Veſſel*, not in a *Cellar*, but in ſome drie *Place*; and it is ſaid, they will laſt long. But it is reported by ſome, they will keep better, in a *Veſſel* half full of *Wine*, ſo that the *Grapes* touch not the *Wine*. 627

It is reported, that the *Preſerving* of the *Stalk*, helpeth to preſerve the *Grape*; Eſpecially if the *Stalk* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*. 628

It is reported by ſome of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let down into *Wells* under *Water*, will keep long. 629

Of *Herbs* and *Plants*, ſome are good to eat *Raw*; As *Lettuce*, *Endive*, *Purſlane*, *Tarragon*, *Creſſes*, *Cucumbers*, *Musk-Melons*, *Radiſh*, &c. Others onely after they are *Boyled*, or have *Paſſed the Fire*, As *Parſley*, *Clary*, *Sage*, *Parſnips*, *Turnips*, *Aſparagus*, *Artichoaks*, (though they alſo being youug are eaten *Raw*:) But a Number of *Herbs* are not *Eſculent* at all; As *Wormwood*, *Graſſe*, *Green-Corn*, *Centory*, *Hyſſope*, *Lavender*, *Balm*, &c. The *Cauſes* are, for that the *Herbs* that are not *Eſculent*, do want the two *Taſtes*, in which *Nouriſhment* reſteth; Which are, *Fat*, and *Sweet*, ; And have (contrariwiſe) *Bitter*, and *Overſtrong Taſtes*, or a *Juyce* ſo crude, as cannot be ripened to the degree of *Nouriſhment*. *Herbs*, and *Plants*, that are *Eſculent Raw*, have *Fatneſs*, or *Sweetneſs*, (as all *Eſculent Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it muſt be ſuch a *Fatneſs*, (for as for *Sweet Things*, they are in effect alwayes *Eſculent*,) as is not Over-groſſe, and Loading of the *Stomack*; For *Parſnips* and *Leeks* have *Fatneſs*; But it is too Groſſe and Heavy without *Boyling*. It muſt be alſo in a Subſtance ſomewhat Tender; For we ſee *Wheat*, *Barley*, *Artichoaks*, are no good *Nouriſhment*, till they have paſſed the *Fire*; But the *Fire* doth ripen, and maketh them ſoft and tender, and ſo they become *Eſculent*. As for *Radiſh*, and *Tarragon*, and the like, they are for *Condiments*, and not for *Nouriſhment*. And even ſome of thoſe *Herbs*, which are not *Eſculent*; 630

lent, are notwithſtanding *Poculent*; As *Hops*, *Broom*, &c. *Quære* what *Herbs* are good for *Drinke*, beſides the two aforenamed; For that it may (perhaps) eaſe the Charge of *Brewing*, if they make *Beer* to require leſſe *Malt*, or make it laſt longer.

631 *Parts* fit for the *Nouriſhment* of *Man*, in *Plants*, are, *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaves*, they give no *Nouriſhment* at all, or very little: No more do *Flowers*, or *Bloſſomes*, or *Stalkes*. The Reaſon is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* conſiſt of an *Oyly* and *Watrie Subſtance* commixed,) have more of the *Oily Subſtance*, And *Leaves*, *Flowers*, &c. of the *Watrie*. And ſecondly, they are more *Concocted*; For the *Root*, which continueth ever in the *Earth*, is ſtill *Concocted* by the *Earth*; And *Fruits*, and *Grains*, (we ſee) are half a year, or more, in *Concocting*; Whereas *Leaves* are out, and Perfect in a Moneth.

632 *Plants* (for the moſt part) are more ſtrong, both in *Taſte* and *Smell*, in the *Seed*, than in the *Leaf* and *Root*. The *Cauſe* is, for that in *Plants* that are not of a Fierce and Eager *Spirit*, the Vertue is increaſed by *Concoction*, and *Maturation*, which is ever moſt in the *Seed*; But in *Plants* that are of a Fierce and Eager *Spirit*, they are ſtronger whileſt the *Spirit* is incloſed in the *Root*; And the *Spirits* doe but weaken, and diſſipate, when they come to the *Air* and *Sunne*; As we ſee it in *Onions*, *Garlick*, *Dragon*, &c. Nay there be *Plants* that have their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Inſipide*; As *Ginger*. The *Cauſe* is, (as was touched before,) for that the *Heat* of thoſe *Plants* is very Diſſipable; which under the *Earth* is contained and held in; But when it commeth to the *Air*, it exhaleth.

633 The *Juyces* of *Fruits* are either *Watrie*, or *Oylie*. I reckon amongſt the *Watrie*, all the *Fruits* out of which *Drinke* is expreſſed; As the *Grape*, the *Apple*, the *Pear*, the *Cherry*, the *Pomegranate*, &c. And there are ſome others, which though they be not in uſe for *Drinke*, yet they appear to be of the ſame *Nature*; As *Plums*, *Services*, *Mulberries*, *Raſps*, *Orenges*, *Limons*, &c. And for thoſe *Juyces*, that are ſo fleſhy, as they cannot make *Drinke* by Expreſſion, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculaque admiſtis imitantur vitea Serbis.

And it may be *Hops* and *Brier-Berries* would doe the like. Thoſe that have *Oylie Juyces*, are; *Olives*, *Almonds*, *Nuts* of all ſorts, *Pine-Apples*, &c. And their *Juyces* are all *Inflammable*. And you muſt obſerve alſo, that ſome of the *Watry Juyces*, after they have gathered *Spirit*, will Burn and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is ſweet, without either *Sharpneſſe* or *Oylineſs*: Such as is the *Fig*, and the *Date*.

634 It hath been noted, that moſt *Trees*, and ſpecially thoſe that bear *Maſt*, are fruitfull but once in two yeares. The *Cauſe* (no doubt) is, the *Expence* of *Sap*; For many *Orchard Trees*, well Cultured, will bear divers yeares together.

635 There is no *Tree*, which beſides the *Naturall Fruit*, doth bear ſo many *Baſtard Fruits*, as the *Oake* doth: For beſides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are Inflammable; And certain *Oake-Berries*, ſticking cloſe to the *Body* of the *Tree* without *Stalk*. It beareth alſo *Miſſeltoe*, though rarely. The *Cauſe* of all theſe may be, the *Cloſeneſſe* and *Solideſs* of the *Wood*, and *Pith* of the *Oake*; Which maketh ſeverall *Juyces* finde ſeverall *Eruptions*. And therefore if you will deviſe to make any *Super-Plants*, you muſt ever give the *Sap* Plentifull Riſing, and Hard Iſſue.

There

There are two *Excreſcences*, which grow upon *Trees*; Both of them in the Nature of *Muſhromes*: The one the *Romanes* called *Boletus*; Which groweth upon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agarick*, (whereof we have ſpoken before,) which groweth upon the Tops of *Oakes*; Though it be affirmed by ſome, that it groweth alſo at the *Roots*. I doe conceive, that many *Excreſcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into ſome *Prenaturall Subſtance*. 636

The greater part of *Trees* bear *Moſt*, and *Beſt*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But ſome bear *Beſt* on the *Top-Boughs*; As *Crabs*, &c. Thoſe that bear beſt below, are ſuch, as Shade doth more good to than Hurt. For generally all *Fruits* bear beſt loweſt; Becauſe the *Sap* tireth not, having but a ſhort Way: And therefore in *Fruits* ſpred upon *Walls*, the Loweſt are the Greateſt, as was formerly ſaid; So it is the *Shade* that hindereth the *Lower-Boughs*; Except it be in ſuch *Trees*, as delight in *Shade*; Or at leaſt bear it well. And therefore, they are either Strong *Trees*, as the *Oak*; Or elſe they have large *Leaves*, as the *Wallnut* and *Fig*; Or elſe they grow in *Piramis*, as the *Pear*. But if they require very much *Sun*, they bear beſt on the *Top*; as it is in *Crabs*, *Apples*, *Plums*, &c. 637

There be *Trees*, that bear beſt, when they begin to be *Old*; As *Almonds*, *Pears*, *Vines*, and all *Trees*, that give *Maſt*. The *Cauſe* is, for that all *Trees*, that bear *Maſt*, have an *Oyly Fruit*; And *Young Trees*, have a more *Watry Juyce*, and leſſe Concocted; And of the ſame kinde alſo is the *Almond*. The *Pear* likewiſe, though it be not *Oylie*, yet it requireth much *Sap*, and well Concocted; For we ſee it is a Heavie *Fruit* and Solid; Much more than *Apples*, *Plums*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *Old*; For that the *Juyce* is better Concocted: And we ſee, that *Wine* is Inflammable; So as it hath a kinde of *Oylineſs*. But the moſt Part of *Trees*, amongſt which are *Apples*, *Plums*, &c. bear beſt when they are *Young*. 638

There be *Plants*, that have a *Milk* in them, when they are Cut; As *Figs*, *Old-Lettuce*, *Sow-Thiſtles*, *Spurge*, &c. The *Cauſe* may be an *Inception* of *Putrefaction*; For thoſe *Milks* have all an *Acrimonie*; Though one would thinke they ſhould be *Lenitive*. For if you write upon Paper, with the *Milk* of the *Fig*, the Letters will not be ſeen, untill you hold the Paper before the Fire, and then they wax Brown; which ſheweth that it is a Sharp or Fretting *Juyce*: *Lettuce* is thought Poyſonous, when it is ſo *Old*, as to have *Milk*; *Spurge* is a kinde of Poyſon in it Self; And as for *Sow-Thiſtles*, though Coneys eat them, yet Sheep and Cartel will not touch them; And beſides, the *Milk* of them, rubbed upon Warts, in ſhort time, weareth them away: Which ſheweth the *Milk* of them to be *Corroſive*. We ſee alſo, that *Wheat*, and other *Corn ſown*, if you take them forth of the *Ground*, before they ſprout, are full of *Milk*; And the Beginning of *Germination* is ever a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* alſo hath a *Milk*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milk*, which hath likewiſe much *Acrimony*; For it cleanſeth the *Eyes*. It is good alſo for *Cataracts*. 639

Muſhromes are reported to grow, as well upon the *Bodies* of *Trees* as upon their *Roots*, or upon the *Earth*: And eſpecially upon the *Oake*. The *Cauſe* is, for that ſtrong *Trees* are towards ſuch *Excreſcences*, in the Nature of *Earth*; And therefore put forth *Moſſe*, *Muſhromes*, and the like. 640

There

641 There is hardly found a *Plant*, that yeeldeth a *Red Juyce*, in the *Blade*, or *Ear*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth chiefly in the *Iſland Soquotra*: The *Herbe Aramanthus*, (indeed,) is *Red* all over; And *Braſil* is *Red* in the *Wood*: And ſo is *Red Sanders*. The *Tree* of the *Sanguis Draconis*, groweth in the form of a *Sugar Loaf*. It is like, the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For we ſee that *Grapes*, and *Pomegranats*, are *Red* in the *Juyce*, but are *Green* in the *Tear*: And this maketh the *Tree* of *Sanguis Draconis* leſſer towards the *Top*; Becauſe the *Juyce* haſteneth not up; And beſides, it is very *Aſtringent*; And therefore of Slow Motion.

642 It is reported, that *Sweet Moſſe*, beſides that upon the *Apple Trees*, groweth likewiſe (ſometimes) upon *Poplars*; And yet (generally) the *Poplar* is a Smooth *Tree* of *Bark*, and hath little *Moſſe*. The *Moſſe* of the *Larix Tree* burneth alſo ſweet, and ſparkleth in the Burning. *Quare* of the *Moſſes* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloes*, &c.

643 The *Death* that is moſt without Pain, hath been noted to be, upon the *Taking* of the *Potion* of *Hemlock*; which in Humanity was the Form of *Execution* of *Capitall Offenders* in *Athens*. The *Poyſon* of the *Aſpe*, that *Cleopatra* uſed, hath ſome affinitie with it. The *Cauſe* is, for that the *Torments* of *Death* are chiefly raiſed by the Striſe of the *Spirits*; And theſe *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extream Old Man. I conceive it is leſſe painfull then *Opium*, becauſe *Opium* hath Parts of *Heat* mixed.

644 There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are Sweet before they ripen, and after grow Spicy. And ſome never *Ripen* to be *Sweet*; As *Tamarinds*, *Barberries*, *Crabs*, *Sloes*, &c. The *Cauſe* is, for that the former Kinde have much and ſubtile *Heat*, which cauſeth Early Sweetneſs; The latter have a *Cold* and *Acide Juyce*; which no *Heat* of the *Sun* can ſweeten. But as for the *Mirabolane*, it hath Parts of Contrary *Natures*; For it is *Sweet* and yet *Aſtringent*.

645 There be few *Herbs* that have a *Salt Taſte*; And contrariwiſe all *Bloud* of *Living Creatures* hath a *Saltneſs*: The *Cauſe* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the Originall *Taſte* remaineth not; For you ſhall have them *Bitter*, *Soure*, *Sweet*, *Biting*, but ſeldome *Salt*: But in *Living Creatures*, all thoſe High *Taſts* may happen to be (ſometimes) in the *Humours*, but are ſeldome in the *Fleſh*, or *Subſtance*; Becauſe it is of a more *Oyly Nature*; which is not very Suſceptible of thoſe *Taſtes*; And the *Saltneſs* it ſelf of *Bloud*, is but a light, and ſecret *Saltneſs*: And even among *Plants*, ſome doe participate of *Saltneſs*, as *Alga Marina*, *Samphire*, *Scorvy-Graſs*, &c. And they report, there is, in ſome of the *Indian Seas*, a *Swimming Plant*, which they call *Salgazus*, ſpreading over the *Sea*, in ſuch ſort, as one would thinke it were a *Meadow*. It is certain, that out of the *Aſhes*, of all *Plants*, they extract a *Salt*, which they uſe in *Medicines*.

646 It is reported by one of the *Ancients* that there is an *Herb* growing in the *Water*, called *Lincoſtis*, which is full of *Prickles*: This *Herb* putteth forth another ſmall *Herb* out of the *Leafe*; which is imputed to ſome *Moiſture*, that is gathered between the *Prickles*, which Putrified by the *Sun*, Germinateth. But I remember alſo I have ſeen, for a great Rarity, one *Roſe* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

647 *Barley*, (as appeareth in the *Malting*,) being ſteeped in *Water* three daves, and afterwards the *Water* drained from it, and the *Barley* turned upon a drie floar, will ſprout, half an Inch long at leaſt: And if it bee let alone, and not

not turned, much more; untill the Heart be out. *Wheat* will doe the same. Trie it also with *Peaſe*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vive*; For there it is of the old Store, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driven: For it appeareth already, by that which hath been said, that *Earth*, is not neceſſary to the firſt Sprouting of *Plants*; And we ſee that *Roſe-Buds* ſet in *Water*, will blow: Therefore trie whether the *Sprouts* of ſuch *Graines* may not be raiſed to a further Degree; As to an *Herbe*, or *Flower*, with *Water* onely; Or ſome ſmall commixture, of *Earth*: For if they will, it ſhould ſeeme by the *Experiments* before, both of the *Malt*, and of the *Roſes*, that they will come farre faſter on in *Water*, than in *Earth*: For the *Nouriſhment* is eaſilier drawn out of *Water*, than out of *Earth*. It may give ſome light alſo, that *Drink* infuſed with *Fleſh*, as that with the *Capon*, &c. will nouriſh faſter and eaſilier, than *Meat* and *Drink* together. Trie the ſame *Experiment* with *Roots*, as well as with *Graines*: As for Example, take a *Turnip*, and ſteep it a while, and then drie it, and ſee whether it will ſprout.

Malt in the *Drenching* will ſwell; And that in ſuch a manner, as after the Putting forth in Sprouts, and the drying upon the Keele, there will be gained at leaſt a Buſhell in eight, and yet the Sprouts are rubbed off; And there will be a Buſhell of *Duſt* beſides the *Malt*: Which I ſuppoſe to be, not onely by the looſe, and open Laying of the *Parts*, but by ſome Addition of *Subſtance*, drawn from the *Water*, in which it was ſteeped. 648

Malt gathereth a *Sweetneſſe* to the *Taſte*, which appeareth yet more in the *Wort*. The *Dulcoration* of *Things* is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nouriſhment*: And the Making of *Things Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*. 649

Moſt *Seeds* in the Growing, leave their *Huſk* or *Rinde* about the *Root*; But the *Onion* will carry it up, that it will be like a Cap upon the Top of the *Young Onion*. The *Cauſe* may be, for that the *Skin* or *Huske* is not eaſie to break; as we ſee by the Pilling of *Onions*, what a holding *Subſtance* the *Skin* is. 650

Plants, that have *Curled Leaves*, doe all abound with *Moyſture*; Which commeth ſo faſt on, as they cannot ſpread themſelves Plain, but muſt needs gather together. The Weakeſt Kinde of *Curling* is *Roughneſſe*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is folding into an *Head*; As in *Cubbage* full growne, and *Cabbage-Lettuce*. 651

It is reported, that *Firre*, and *Pine*, eſpecially if they be *Old* and *Putrified*, though they ſhine not, as ſome *Rotten Woods* doe, yet in the ſudden *Breaking* they will ſparkle like Hard *Sugar*. 652

The *Roots* of *Trees* doe, (ſome of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some ſpread more towards the *Surface* of the *Earth*; As the *Aſh*, *Cypreſſe-Tree*, *Olive*, &c. The *Cauſe* of this latter may be, for that ſuch *Trees* as love the *Sunne*, doe not willingly deſcend farre into the *Earth*; And therefore they are (commonly) *Trees*, that ſhoot up much; For in their *Body*, their deſire of Approach to the *Sunne*, maketh them ſpread the leſſe. And the ſame Reaſon, under *Ground*, to avoid Receſſe from the *Sunne*, maketh them ſpread the more. And we ſee it commeth to paſſe in ſome *Trees*, which have beene planted too deepe in the *Ground*, that for love of Approach to the *Sunne*, they forſake their firſt *Root*, and put out another more towards the *Top* of the *Earth*. And we ſee alſo, that the *Olive* is full of *Oylie Juyce*; And *Aſh* maketh the beſt Fire; And 653

Cypreſſe is an *Hot Tree*. As for the *Oake*, which is of the former ſort, it loveth the *Earth*; And therefore groweth ſlowly. And for the *Pine*, and *Firre* likewiſe, they have ſo much *Heat* in themſelves, as they need leſſe the *Heat* of the *Sunne*. There be *Herbs* alſo, that have the ſame difference; As the *Herbe* they call *Morſus Diaboli*; which putteth the *Root* downe ſo low, as you cannot pull it up without *Breaking*; Which gave Occaſion to the *Name*, and *Fable*; For that it was ſaid, it was ſo wholſome a *Root*, that the *Devill*, when it was gathered, bit it for *Envy*: And ſome of the *Ancients* doe report, that there was a goodly *Firre*, (which they deſired to remove whole) that had a *Root* under *Ground* eight Cubits deepe; And ſo the *Root* came up broken.

654 It hath beene obſerved, that a *Branch* of a *Tree*, being *Unbarked* ſome ſpace at the Bottome, and ſo ſet into the *Ground*, hath growen; even of ſuch *Trees*, as if the *Branch* were ſet with the *Barke* on, they would not grow; yet contrariwiſe we ſee, that a *Tree* Pared round in the *Body*, above *Ground*, will die. The *Cauſe* may be, for that the *Unbarkt Part* draweth the Nouriſhment bet, but the *Barke* continueth it onely.

655 *Grapes* will continue *Freſh*, and *Moiſt*, all Winter long, if you hang them, *Cluſter* by *Cluſter*, in the *Roofe* of a *Warme Roome*; Eſpecially, if when you gather the *Cluſter*, you take off with the *Cluſter* ſome of the *Stocke*.

656 The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath theſe Properties; That it is *Hollow*; That it is *Knuckled*, both *Stalke*, and *Root*; that being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughs*, though many *Stalks* out of one *Root*. It differeth much in greatneſſe; The ſmalleſt being fit for Thatching of Houſes; And Stopping the Chinkes of Ships; Better than Glew, or Pitch. The Second Bigneſſe, is uſed for Angle-Rods, and Staves; And in *China* for beating of Offenders upon the Thighs. The differing *Kinds* of them are; The *Common Reed*; The *Caſsia Fiſtula*; And the *Sugar-Reed*. Of all *Plants* it boweth the eaſieſt, and riſeth againe. It ſeemeth, that amongſt *Plants*, which are nouriſhed with *Mixture* of *Earth* and *Water*, it draweth moſt Nouriſhment from *Water*; which maketh it the *Smootheſt* of all others in *Barke*; And the *Holloweſt* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watrie* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thick*; As *Apples*. Some *Gummy*; As *Cherries*. Some *Froathy*; As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* ſeemeth to be (almoſt) towards the *Barke* onely; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be drie. The *Trees*, which have the *Moiſteſt Juyces* in their *Fruit*, have commonly the *Moiſteſt Sap* in their *Body*; For the *Vines* and *Peares* are very *Moiſt*; *Apples* ſomewhat more *Spongie*: The *Milke* of the *Figge* hath the Quality of the *Rennet*, to gather *Cheeſe*: And ſo have certaine *Soure Herbs* wherewith they make *Cheeſe* in *Lent*.

658 The *Timber* and *Wood* are, in ſome *Trees*, more *Cleane*, in ſome more *Knottie*; And it is a good Triall, to trie it by Speaking at one End, and Laying the Eare at the Other: For if it be *Knottie*, the Voice will not paſſe well. Some have the *Veines* more varied and chamloted; As *Oake*, whereof *Wainſcot* is made; *Maple*, whereof *Trenchers* are made: Some more ſmooth, as *Firre* and *Walnut*: Some doe more eaſily breed *Wormes* and *Spiders*; Some more hardly; as it is ſaid of *Iriſh Trees*: Beſides there be a Number of Differences that concerne their Uſe; As *Oake*, *Cedar*, and *Cheſnut*, are

the

the best Builders: Some are best for *Plough-Timber*; As *Ash*; Some for *Peeres*, that are sometimes wet, and sometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* Tough, and not apt to rift with *Ordnance*; Wherein *English* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre* and *Pine*, because of their Length, Straightnesse, and Lightnesse: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Ash*: And so of the rest.

The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casuall*: For many have been translated, and have prospered well; As *Damaske-Roses*, that have not been knowne in *England* above an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerly *Naturall*; As the *Firre* and *Pine* love the Mountaines; The *Poplar*, *Willow*, *Sallow*, and *Alder*, love *Rivers*, and *Moist Places*: The *Ash* loveth *Coppices*; But is best in *Standards* alone: *Juniper* loveth *Chalke*; And so doe most *Fruit-Trees*: *Sampire* groweth but upon *Rockes*: *Reeds* and *Osiers* grow where they are washed with *Water*: The *Vine* loveth Sides of *Hils*, turning upon the *South-East-Sunne*, &c. 659

The *Putting forth* of certaine *Herbs* discovereth of what Nature the *Ground* where they put forth, is: As *Wilde Thyme* sheweth good *Feeding Ground* for *Cattell*: *Bettony* and *Strawberries* sheweth *Grounds* fit for Wood: *Camomill* sheweth Mellow *Grounds* fit for *Wheat*. *Mustard-Seed*, growing after the *Plough*, sheweth a good *Strung Ground* also for *Wheat*: *Burnet* sheweth good *Meadow*: And the like. 660

There are found, in divers *Countries*, some other *Plants*, that grow out of *Trees*, and *Plants*, besides *Misseltoe*: As in *Syria*, there is an *Herb* called *Cassytas*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Faunos*, upon the *Wilde Olive*. And an *Herb* called *Hippophaston* upon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sickenesse*. 661

It hath been observed, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds*, are thought to be great Enemies to *Fruit*; yet nevertheless *South-Winds* are also found to doe Hurt; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West Winds* are the best. It hath been observed also, that *Green* and *Open Winters* doe hurt *Trees*; Insomuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will die. The *Cause* is the same with the former, because the *Lust* of the *Earth* overspendeth it selfe; However some other of the *Ancients* have commended *Warme Winters*. 662

Snowes, lying long, cause a *Fruitfull Teare*; For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teat*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Froth* of the *Cloudy Waters*. 663

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Olives*, *Pomegranates*; Yet it is rather for Plenty, than for Goodnesse; For the best *Wines* are in the Driest *Vintages*: *Small Showers* are likewise good for *Corne*, so as *Parching Heats* come not upon them. Generally, *Night-Showers* are better than *Day-Showers*; 664

Showers; For that the *Sunne* followeth not ſo faſt upon them: and we ſee, even in *Watering* by the *Hand*, it is beſt, in *Summer time*, to water in the *Evening*.

665 The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently enquired. The *Earth*, that with *Showers* doth eaſilieſt *Soften*, is commended; And yet ſome *Earth* of that kinde will be very Drie, and Hard before the *Showers*. The *Earth* that caſteth up from the *Plough*, a great *Clod*, is not ſo good, as that, which caſteth up a Smaller *Clod*. The *Earth*, that putteth forth *Moſſe* eaſily, and may be called *Mouldie*, is not good. The *Earth*, that ſmelleth well upon the Digging, or Ploughing, is commended; As containing the *Juyce* of *Vegetables* almoſt already prepared. It is thought by ſome, that the *Ends* of low *Raine-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well be; For that the *Earth* is moſt *Roſcide*: And therefore it is commended for a Signe of good *Earth*. The *Poorneſſe* of the *Herbs*, (it is plaine,) ſhew the *Poureneſſe* of the *Earth*; And eſpecially if they be in *Colour* more darke: But if the *Herbs* ſhew *Withered*, or *Blaſted* at the Top, it ſheweth the *Earth* to be very *Cold*: And ſo doth the *Moſſineſſe* of *Trees*. The *Earth*, whereof the *Graſſe* is ſoone *Parched* with the *Sunne*, and *Toaſted*, is commonly *Forced Earth*, and Barren in his owne Nature. The *Tender*, *Cheſſome*, and *Mellow Earth*, is the beſt; Being meere *Mould*, between the two Extreames of *Clay*, and *Sand*; Eſpecially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will ſcarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Juyce*.

666 It is ſtrange, which is obſerved by ſome of the *Ancients*, that *Duſt* helpeth the *Fruitfulneſſe* of *Trees*; and of *Vines*, by name: Inſomuch as they caſt Duſt upon them of purpoſe. It ſhould ſeeme, that that Powdring, when a Shower commeth, maketh a kinde of Soyling to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that Countries, where the *Fields* and *Wayes* are *Duſty*, beare the beſt *Vines*.

667 It is commended by the *Ancients*, for an Excellent *Helpe* to *Trees*, to lay the *Stalkes*, and *Leaves* of *Lupines* about the *Roots*; Or to Plough them into the *Ground*, where you will ſow *Corne*. The *Burning* alſo of the *Cuttings* of *Vines*, and *Caſting* them upon *Land*, doth much Good. And it was generally received of old, that *Dunging* of *Grounds*, when the *Weſt Winde* bloweth, and in the *Decreaſe* of the *Moone*, doth greatly helpe; The *Earth* (as it ſeemeth) being then more thirſty, and open, to receive the *Dung*.

668 The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in uſe: The *Ancients* had it, and that three wayes: The firſt was *Inſition*, which is the Ordinary manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and putting in the *Cions* there: And the Third was Paring of two *Vines*, that grow together, to the *Marrow*, and Binding them cloſe.

669 The *Diſeaſes* and ill *Accidents* of *Corne*, are worthy to be enquired; And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mill-Dew* is one of the Greateſt; which (out of queſtion) commeth by *Cloſeneſſe* of *Aire*; And therefore in *Hils*, or large *Champaigne Grounds*, it ſeldome commeth; Such as is with us *York's Woald*. This cannot bee remedied, otherwiſe than that in *Countries* of ſmall Encloſure, the *Grounds* bee turned into larger *Fields*: Which I have knowne to doe good in ſome Farmes. Another *Diſeaſe* is the *Putting forth* of *Wilde Oates*, whereinto *Corne* oftentimes, (eſpecially *Barley*,) doth degenerate. It happeneth chiefly from the

the *Weakneſſe* of the *Graine* that is ſowen; For if it bee either too Old, or Mouldy, it will bring forth *Wilde Oates*. Another *Diſeaſe* is the *Saciety* of the *Ground*; For if you ſow one *Ground* ſtill with the ſame *Corne*, (I mean not the ſame *Corne* that grew upon the ſame *Ground*,) but the ſame *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c.) it will proſper but poorly: Therefore beſides the *Reſting* of the *Ground*, you muſt vary the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flowring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with us is rare; But in Hotter *Countries*, common: Inſomuch as the Word, *Calamitas*, was firſt derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-Wet* at *Sowing-Time*; which with us breedeth much *Dearth*; Inſomuch as the *Corne* never commeth up; And (many times) they are forced to reſow *Summer-Corne*, where they ſowed *Winter-Corne*. Another ill *Accident* is *Bitter Froſts*, continued, without *Snow*; Eſpecially in the Beginning of the *Winter*, after the *Seed* is new Sowen. Another *Diſeaſe* is *Wormes*; which ſometimes breed in the *Root*, and happen upon Hot *Sunnes*, and *Showres*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Eſpecially when *Hot Sunnes* breake often out of *Clouds*. Another *Diſeaſe* is *Weeds*; And they are ſuch, as either Choak, and Over-ſhadow the *Corne*, and beare it down; Or ſtarve the *Corne*, and deceive it of Nouriſhment. Another *Diſeaſe* is, *Over-Rankneſſe* of the *Corne*; Which they uſe to remedy, by *Mowing it* after it is come up; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harveſt*. Another ill *Accident* is, if the *Seed* happen to have touched *Oyle*, or any *Thing*, that is *Fat*; For thoſe *Subſtances* have an *Antipathy* with *Nouriſhment* of *Water*.

670 The *Remedies* of the *Diſeaſes* of *Corne* have been obſerved as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preſervative*: The *Mingling* of *Seed-Corne* with *Aſhes*, is thought to be good: The *Sowing* at the *Wane* of the *Moon*, is thought to make the *Corne* ſound: It hath not beene practiſed, but it is thought to be of uſe, to make ſome *Miſſellane* in *Corne*; As if you ſow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath beene obſerved, that the *Sowing* of *Corne* with *Houſlecke*, doth good. Though *Graine*, that toucheth *Oyle*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to aſſure it againſt *Wormes*. It is reported alſo, that if *Corne* be *Mowed*, it will make the *Graine* Longer, but Emptier, and having more of the *Huske*.

671 It hath been noted, that *Seed* of a yeare old, is the Beſt; And of two or three yeares is worſe; And that which is more Old, is quite Barren; Though (no doubt) ſome *Seed* and *Graines* laſt better than others. The *Corne*, which in the *Vanning* lieth loweſt, is the beſt: And the *Corne*, which broken or bitten retaineth a little *Yellowneſſe*, is better than that which is very *White*.

672 It hath been obſerved, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furtheſt into the *Earth*; Inſomuch as it hath been knowne to goe three Cubits deep; And that it is the *Root* that continueth fit (longeſt) to be ſet againe, of any *Root* that groweth. It is a *Cold*, and *Acide Herb*, that (as it ſeemeth) loveth the *Earth*, and is not much drawne by the *Sunne*.

673 It hath beene obſerved, that ſome *Herbs* like beſt, being watred with *Salt-Water*; And *Radiſh*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended

to ſome other *Herbs*; Eſpecially ſuch as are Strong; As *Tarragon*, *Muſtard-Seed*, *Rocket*, and the like.

674 It is ſtrange, that is generally received, how ſome *Poyſonous Beaſts* affect *Odorate* and *Wholſome Herbs*; As that the *Snake* loveth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other Coverture, that they take liking in, than the Vertue of the *Herb*.

675 It were a Matter of great Profit, (ſave that I doubt it is too Conjecturall to venture upon,) if one could diſcerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by ſome *Signes* and *Prognoſticks*, in the Beginning of the Yeare: For as for thoſe, that are like to be in *Plenty*, they may be bargained for, upon the *Ground*; As the Old Relation was of *Thales*; who to ſhew how eaſie it was for a *Philoſopher* to be rich, when he fore-ſaw a great *Plenty* of *Olives*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the Old Store. Long *Continuance* of *Snow* is beleeved to make a *Fruitfull Year* of *Corn*: An *Early Winter*, or a very *Late Winter*, a *Barren Year* of *Corne*: An Open and Serene *Winter*, an ill Yeare of *Fruit*: Theſe we have partly touched before: But other *Prognoſticks* of like Nature are diligently to be enquired.

676 There ſeeme to be, in ſome *Plants*, *Singularities*, wherein they differ from all Other; The *Olive* hath the *Oyly Part*, onely on the *Outſide*; Whereas all other *Fruits* have it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines Kernels*. The *Pomgranate* and *Pine-Apple* have onely, amongſt *Fruits*, *Graines* diſtinct in ſeveral *Cels*. No *Herbs* have *Curled Leaves*, but *Cabbage*, and *Cabbage-Lettuce*. None have double *Leaves*, one belonging to the *Stalk*, another to the *Fruit* or *Seed*, but the *Artichoake*: No *Flower* hath that kind of Spread that the *Woodbine* hath. This may be a large Field of Contemplation; For it ſheweth that in the Frame of *Nature*, there is, in the Producing of ſome *Species*, a Compoſition of Matter, which happeneth oft, and may be much diverſified: In others, ſuch as happeneth rarely, and admitteth little Variety: for ſo it is likewiſe in *Beaſts*: *Dogs* have a reſemblance with *Wolves*, and *Foxes*; *Horſes* with *Aſſes*; *Kine* with *Buffles*; *Hares* with *Coneys*; &c. And ſo in *Birds*: *Kites* and *Keſtrels* have a Reſemblance with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black Birds* with *Thruſhes*, and *Maviſſes*; *Crowes* with *Ravens*, *Dawes*, and *Choughes*, &c. But *Elephants* and *Swine* amongſt *Beaſts*; And the *Bird* of *Paradiſe*, and the *Peacocke* amongſt *Birds*; And ſome few others; have ſcarce any other *Species*, that have Affinity with them.

We leave the *Deſcription* of *Plants*, and their *Vertues*, to *Herbals*, and other like *Bookes* of *Naturall Hiſtory*: Wherein *Mens Diligence* hath been great, even to *Curioſitie*: For our *Experiments* are onely ſuch, as doe ever aſcend a Degree to the *Deriving* of *Cauſes*, and *Extracting* of *Axiomes*, which, we are not ignorant, but that ſome, both of the *Ancient*, and *Moderne Writers*, have alſo laboured; But their *Cauſes*, and *Axiomes*, are ſo full of Imagination, and ſo infected with the old Received *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

It

Experiment Solitary touching *Healing* of *Wounds*. 677

IT hath been obſerved, by ſome of the *Ancients*, that *Skins*, (eſpecially of *Rams* newly pulled off, and applyed to the *Wounds* of *Stripes*, do keep them from Swelling, and Exulcerating; And likewiſe Heal them, and Cloſe them up; And that the *Whites* of *Eggs* doe the ſame. The *Cauſe* is, a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viſcous, and do bridle the *Deſluxe* of *Humours* to the Hurts, without Penning them in too much.

Experiment Solitary touching *Fat diffuſed* in *Fleſh*. 678

YOu may turn (almoſt) all *Fleſh* into a *Fatty Subſtance*, if you take *Fleſh*, and cut it into Peeces, and put the Peeces into a *Glaſſe* covered with Parchment; And ſo let the *Glaſſe* ſtand ſix or ſeven Hours in *Boyling Water*. It may bee an *Experiment* of Profit, for making of *Fat* or *Greaſe*, for many uſes, But then it muſt be of ſuch *Fleſh* as is not Edible; As *Horſes*, *Dogs*, *Bears*, *Foxes*, *Padgers*, &c.

Experiment Solitary, touching *Ripening* of *Drinke* before the *Time*. 679

IT is reported by one of the *Ancients*, that *New Wine*, put into *Veſſels* well ſtopped, and the *Veſſels* let down into the *Sea*, will accelerate very much, The Making of them Ripe, and Potable. The ſame would be tried in *Wort*.

Experiment Solitary, touching *Pilоſitie* and *Plumage*. 680

BEaſts are more *Hairie* than *Men*; And *Savage Men* more than *Civill*; And the *Plumage* of *Birds* exceedeth the *Piloſitie* of *Beaſts*. The *Cauſe* of the Smoothneſs in *Men*, is not any Abundance of *Heat*, and *Moiſture*, though that indeed cauſeth *Piloſitie*; But there is requiſite to *Piloſitie*, not ſo much *Heat* and *Moiſture*, as *Excrementitious Heat* and *Moiſture*: (For whatſoever aſſimilateth goeth not into the *Hair*:) And *Excrementitious Moiſture* aboundeth moſt in *Beaſts*, and *Men* that are more *Savage*. Much the ſame Reaſon is there of the *Plumage* of *Birds*; For *Birds* aſſimilate leſſe, and excern more than *Beaſts*: for their *Excrements* are ever liquid, and their *Fleſh*, (generally) more drie: Beſide, they have not *Inſtruments* for *Urine*, And ſo all the *Excrementitious Moiſture* goeth into the *Feathers*: And therefore it is no Marvell, though *Birds* bee commonly better Meat than *Beaſts*, becauſe their *Fleſh* doth aſſimilate more finely, and ſecerneth more ſubtilly. Again, the *Head* of *Man* hath *Hair* upon the *firſt Birth*, which no other *Part* of the *Body* hath. The *Cauſe* may be *Want* of *Perſpiration*: For Much of the Matter of *Hair*, in the other *Parts* of the *Body*, goeth forth by Inſenſible *Perſpiration*; And beſides, the *Skull* being of a more ſolid Subſtance, nouriſheth and aſſimilateth leſs, and excerneth more: And ſo likewiſe doth the *Chin*; We ſee alſo that *Hair* commeth not upon the *Palmes* of the *Hands*, nor *Soals* of the *Feet*; Which are *Parts* more *Perſpirable*. And *Children* likewiſe are not *Hairy*, for that their *Skins* are more *Perſpirable*.

Experiment Solitary touching the *Quickneſs* of *Motion* in *Birds*. 681

BIrds are of *Swifter Motion* then *Beaſts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beaſts*. The *Cauſe* is, for that the *Spirits* in *Birds*, are in greater Proportion, in compariſon of the Bulk of their Body, than in *Beaſts*: For as for the Reaſon that ſome give, that they are partly Carried, whereas *Beaſts* go, that is Nothing; For by that Reaſon Swimming ſhould be ſwifter, than Running: And that Kind of *Carriage* alſo, is not without Labour of the *Wing*.

Experiment Solitary touching the different *Clearneſs* of the *Sea*. 682

THe *Sea* is *Clearer*, when the *North-Wind* bloweth, than when the *South-Wind*. The *Cauſe* is, for that *Salt-Water* hath a little *Oylineſs* in the *Surface* thereof; As appeareth in very Hot Dayes: And again, for that the *Southern*

Southern Wind relaxeth the *Water* ſomewhat; As no *Water Boyling* is ſo clear as *Cold Water.*

Experiment Solitary touching the different *Heats* of *Fire* and *Boyling Water.* 683

Fire burneth *Wood*, making it firſt *Luminous*; Then *Black* and *Brittle*; And laſtly, *Broken* and *Incinerate*: *Scalding Water* doth none of theſe. The *Cauſe* is, for that by *Fire*, the *Spirit* of the *Body* is firſt *Refined*, and then *Emitted*; Whereof the *Refining*, or Attenuation cauſeth the *Light*; And the *Emiſſion*, firſt the *Fragilitie*, and after the *Diſſolution* into *Aſhes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* ſo much; And beſides Part of the *Water* entreth; Which doth increaſe the *Spirit*, and in a degree extinguiſh it: Therefore we ſee that *Hot Water* will quench *Fire.* And again we ſee that in *Bodies* wherein the *Water* doth not much enter, but only the *Heat* paſſeth, *Hot Water* worketh the Effects of *Fire*: As in *Eggs Boyled* and *Roaſted*, (into which the *Water* entreth not at all, there is ſcarce difference to be diſcerned; But in *Fruit*, and *Fleſh*, whereinto the *Water* entreth, in ſome Part, there is much more difference.

Experiment Solitary touching the *Qualification* of *Heat* by *Moiſture.* 684

THe *Bottome* of a *Veſſel* of *Boyling Water*, (as hath been obſerved,) is not very much *Heated*, So as men may put their hand under the *Veſſell*, and remove it. The *Cauſe* is, for that the *Moiſture* of *Water*, as it quencheth Coals, where it entreth; So it doth allay Heat, where it toucheth: And therefore note well, that *Moiſture*, although it doth not paſs thorow *Bodies*, without *Communication* of ſome *Subſtance*, (As *Heat* and *Cold* doe;) yet it worketh manifeſt Effects; not by Entrance of the Body, but by Qualifying of the Heat, and Cold: As we ſee in this *Inſtance*: And wee ſee likewiſe, that the *Water* of *Things diſtilled* in *Water*, (which they call the *Bath*) differeth not much from the *Water* of *Things diſtilled* by *Fire*: We ſee alſo, that *Pewter-Diſhes*, with *Water* in them, will not Melt eaſily; But without it, they will; Nay we ſee more, that *Butter*, or *Oile*, which in themſelves are Inflammable, yet by the Vertue of their *Moiſture*, will doe the like.

Experiment Solitary touching *Yawning.* 685

IT hath been noted by the *Ancients*, that it is dangerous to Pick ones *Ear*, whileſt he *Yawneth.* The *Cauſe* is, for that in *Yawning*, the Inner *Parchment* of the *Ear* is extended, by the *Drawing* in of the *Spirit* and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is firſt ſtrongly Drawn in, and then ſtrongly Expelled.

Experiment Solitary, touching the *Hiccough.* 686

IT hath been obſerved by the *Ancients*, that *Sneezing* doth ceaſe the *Hiccough.* The *Cauſe* is, for that the *Motion* of the *Hiccough* is a *lifting up* of the *Stomack*; which *Sneezing* doth ſomewhat depreſſe, and divert the *Motion* another way. For firſt we ſee, that the *Hiccough* cometh of *Fulneſs* of *Meat*, (eſpecially in *Children*,) which cauſeth an Extenſion of the *Stomack*: Wee ſee alſo, it is cauſed by *Acide Meats*, or *Drinks*, which is by the *Pricking* of the *Stomack*: And this *Motion* is ceaſed either by *Diverſion*; Or by *Detention* of the *Spirits*: *Diverſion*, as in *Sneezing*; *Detention*, as we ſee *Holding* of the *Breath*, doth help ſomewhat to ceaſe the *Hiccough*: And putting a man into an Earneſt Studie doth the like: As is commonly uſed: And *Vinegar* put to the *Noſtrils*, or *Gargarized*, doth it alſo; For that it is *Aſtringent*, and inhibiteth the *Motion* of the Spirit.

Experiment Solitary, touching *Sneezing.* 687

LOoking againſt the *Sun*, doth induce *Sneezing.* The *Cauſe* is, not the *Heating* of the *Noſtrils*; For then the holding up of the *Noſtrils* againſt the

the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Brain*: For it will make the *Eyes* runne with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nosthrils*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nosthrils* within, doth draw the *Moisture* to the *Nosthrils*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene observed, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they runne with Water, will prevent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Nosthrils*, is diverted to the *Eyes*.

Experiment Solitary touching the *Tenderneſſe* of the *Teeth*. 688

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cauſe* is double, The One, for that the *Reſiſtance* of *Bone* to *Cold*, is greater than of *Fleſh*; for that the *Fleſh* ſhrinketh, but the *Bone* reſiſteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth*, are *Parts* without *Blood*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we ſee, that the *Sinewes* are much affected with *Cold*; For that they are *Parts* without *Blood*: So the *Bones* in Sharpe *Colds* waxe *Brittle*: And therefore it hath been ſeene, that all *Contuſions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiment Solitary touching the *Tongue*. 689

IT hath been noted, that the *Tongue* receiveth, more eaſily, *Tokens* of *Diſeaſes*, than the other *Parts*; As of *Heats* within, which appeare moſt in the *Blackneſſe* of the *Tongue*. Againe, *Pied Cattell* are ſpotted in their *Tongues*, &c. The *Cauſe* is, (no doubt,) the *Tenderneſſe* of the *Part*, which thereby receiveth more eaſily all *Alterations*, than any other *Parts* of the *Fleſh*.

Experiment Solitary touching the *Taſte*. 690

VVHen the *Mouth* is out of *Taſte*, it maketh Things taſte, ſometimes *Salt*; Chiefly *Bitter*; And ſometimes *Loathſome*; But never *Sweet*. The *Cauſe* is, the *Corrupting* of the *Moiſture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathſome*; But *Sweet* never; For the reſt are *Degrees* of *Corruption*.

Experiment Solitary, touching ſome *Prognoſticks* of *Peſtilentiall Seaſons*. 691

IT was obſerved in the *Great Plague* of the laſt Yeare, that there were ſeene, in divers *Ditches*, and low grounds, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the leaſt; Whereas *Toads* (uſually) have no *Tailes* at all. Which argueth a great Diſpoſition to *Putrefaction* in the *Soile* and *Aire*. It is reported likewiſe, that *Roots*, (ſuch as *Carrets*, and *Parſnips*,) are more *Sweet*, and *Luſhious*, in Infectious Yeares, than in other Years.

Experiment Solitary, touching *Speciall Simples* for *Medicines*. 692

VVIſe *Phiſitians* ſhould with all diligence inquire, what *Simples* Nature yeeldeth, that have extreame *Subtile Parts*, without any *Mordication*, or *Acrimony*: For they undermine that which is *Hard*; They open that which is *Stopped*, and *Shut*; And they expell that which is *Offenſive*, gently, without too much *Perturbation*. Of this Kind are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this Kinde is the *Dwarfe-Pine*; which is Proper for the *Jaundies*: Of this Kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this Kinde is *Piony*; which is Proper for *Stoppings* in the *Head*: Of this Kinde is *Fumitory*, which is Proper for the *Spleen*; And a Number of others. Generally, divers *Creatures* bred of *Putrefaction*, though they be ſomewhat loathſome to take, are of this kinde; As *Earth-Wormes*, *Timber-Sowes*, *Snailes*, &c. And I conceive, that the *Trochiches* of *Vipers*, (which are ſo much magnified,) and the *Fleſh* of *Snakes* ſome wayes condited,

condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of *Beasts Putrefied*; (as *Castoreum*, and *Musk*, which have extream *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefaction* of *Plants*, (as *Agaricke*, and *Jewes-Eare*,) are of greatest Vertue. The *Cause* is, for that *Putrefaction* is the Subtilest of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take down the *Lives* of *Living Creatures*, (which some of the *Paracelsians* say (if they could be taken down,) would make us *Immortall*;) the Next is for *Subtilty* of *Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

Experiments in Comfort, touching *Venus*.

693 IT hath been observed by the *Ancients*, that *Much Use* of *Venus* doth *Dim* the *Sight*; And yet *Eunuches*, which are unable to generate, are (nevertheless) also *Dimme-Sighted*. The *Cause* of *Dimnesse* of *Sight*, in the Former, is the *Expence* of *Spirits*: In the Latter, the *Over-moisture* of the *Braine*, For the *Over-Moisture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their Passages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurreth as another *Cause*: we see also that *Blindnesse* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the Swelling of their Thighes, the Looseneſse of their Belly, the Smoothnesse of their Skinne, &c.

694 The *Pleasure* in the *Act* of *Venus*, is the greatest of the *Pleasures* of the *Senses*; The Matching of it with *Itch* is unproper; though that also be Pleasing to the touch. But the *Causes* are Profound. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many Severall *Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of severall frame; And so are the Parts for Generation. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*; And if there were any other differing *Organs* and Qualified *Perforations*, for the *Spirits* to pass; there would be more than the *Five Senses*: Neither doe we well know, whether some *Beasts* and *Birds*, have not *Senses* that we know not; And the very *Sent* of *Dogs* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper, than those of the other *Senses*; As we see in *Warming* upon *Cold*; Or *Refrigeration* upon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits immediately*, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smels*; And *Wine*, and the like *Sweet Vapours*. For *Smels*, we see their great and sudden Effect in fetching *Men* againe, when they swoune: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkennesse*, is next the *Pleasure* of *Venus*: And *Great Joyes* (likewise) make the *Spirits* move, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

695 It hath been alwayes observed, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The *Cause* is, for that the *Spirits*, in a *Body* more Hot and Drie, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the use of *Venus*, in *Moist* and *well habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is evident; For that it is a Principall *Evacuation*, especially of the *Spirits*: For of the *spirits*, there is scarce any *Evacuation*,

but

but in *Venus*, and *Exerciſe*. And therefore the *Omiſsion* of either of them, breedeth all *Diſeaſes* of *Repletion*.

Experiments In Conſort, touching the *Inſecta*.

The *Nature* of *Vivification* is very worthy the Enquiry: And as the *Nature* of *Things* is commonly better perceived, in Smal, than in Great; and in unperfect, than in Perfect; and in Parts, than in whole: So the *Nature* of *Vivification* is beſt inquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. Firſt, in *Diſcloſing* the *Originall* of *Vivification*. Secondly, in *Diſcloſing* the *Originall* of *Figuration*. Thirdly, in *Diſcloſing* many things in the *Nature* of *Perfect Creatures*, which in them lie more hidden. And Fourthly, in *Traducing* by way of *Operation*, ſome *Obſervations* in the *Inſecta*, to work *Effects* upon *Perfect Creatures*. Note that the word *Inſecta* agreeth not with the Matter, but we ever uſe it for Brevities ſake, intending by it *Creatures bred of Putrefaction*.

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The *Inſecta* are found to breed out of ſeverall *Matters*: Some breed of *Mud* or *Dung*; As the *Earth-worms*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preſerve it ſelf: And for *Dung*, all *Excrements* are the *Refuſe* and *Putrefactions* of *Nouriſhment*. Some breed in *Wood*, both Growing, and Cut down. *Quære* in what *Woods* moſt, and at what Seaſons? We ſee that the *Worms* with many Feet, which round themſelves into Balls, are bred chiefly under *Logs* of *Timber*, but not in the *Timber*; And they are ſaid to bee found alſo, (many times,) in *Gardens*, where no *Logs* are. But it ſeemeth their *Generation* requireth a *Coverture*, both from *Sun*, and *Rain* or *Dew*; As the *Timber* is; And therefore they are not *Venemous*, but (contrariwiſe) are held by the *Phyſitians* to clarifie the *Bloud*. It is obſerved alſo that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Hair* of *Living Creatures*; As *Lice*, and *Tikes*, which are bred by the *Sweat* cloſe kept, and ſomewhat airefied by the *Hair*. The *Excrements* of *Living Creatures* doe not onely breed *Inſecta*, when they are Excerned, but alſo while they are in the *Body*; As in *Wormes* whereto Children are moſt ſubject, and are chiefly in the Guts. And it hath been lately obſerved by *Phyſicians*, that in many *Peſtilent Diſeaſes*, there are *Worms* found in the upper Parts of the Body, where *Excrements* are not, but only *Humours Putrified*. *Fleas* breed principally of *Straw* or *Mats*, where there hath been a little *Moiſture*; Or the *Chamber* and *Bed-ſtraw*, kept cloſe, and not Aired. It is received that they are killed by ſtrewing *Worm-wood* in the *Rooms*. And it is truly obſerved, that *Bitter Things* are apt, rather to kill, then engender *Putrefaction*; And they be *Things* that are *Fat*, or *Sweet*, that are apteſt to *Putrifie*. There is a *Worm*, that breedeth in *Meal*, of the ſhape of a large white *Maggot*, which is given as a great dainty to *Nightingales*. The *Moath* breedeth upon *Cloth*, and other *Lanifices*: Eſpecially if they be laid up dankiſh, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worm* called a *Wevill*, bred under *Ground*, and that feedeth upon *Roots*; As *Parſnips*, *Carrets*, &c. Some breed in *Waters*, eſpecially ſhaded, but they muſt be *Standing Waters*; As the *Water-Spider*, that hath ſix Legs. The *Flie* called the *Gad-flie*, breedeth of ſomewhat that Swimmeth upon the Top of the *Water*, and is moſt about *Ponds*. There is a *Worm* that breedeth of the *Dregs* of

of *Wine Decayed*, which afterwards, (as is obſerved by ſome of the *Ancients*) turneth into a *Gnat*. It hath been obſerved by the *Ancients*, that there is a *Worm* that breedeth in old *Snow*, and is of Colour Reddiſh, and dull of Motion, and dyeth ſoon after it commeth out of *Snow*. Which ſhould ſhew, that *Snow* hath in it a ſecret *Warmth*; For elſe it could hardly Vivifie. And the Reaſon of the Dying of the *Worm*, may be the ſudden Exhaling of that little *Spirit*, as ſoon as it cometh out of the *Cold*, which had ſhut it in. For as *Butterflies* quicken with *Heat*, which were benummed with *Cold*; So *Spirits* may exhale with *Heat*, which were preſerved in *Cold*. It is affirmed both by the *Ancient* and *Modern Obſervation*, that in *Furnaces* of *Copper* and *Braſs*, where *Chalcites*, (which is *Vitriol*,) is often caſt in, to mend the working, there riſeth ſuddenly a *Flie*, which ſometimes moveth, as if it took hold on the walls of the *Furnace*; Sometimes is ſeen moving in the *Fire* below; And dieth preſently, as ſoon as it is out of the *Furnace*. Which is a Noble *Inſtance*, and worthy to be weighed; for it ſheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Living Creatures*, wil Vivifie, if it have Matter Proportionable. Now the great *Axiome* of *Vivification* is, that there muſt be *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; *Matter Viſcous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be *put forth*, and *Figured*. Now a *Spirit* dilated by ſo ardent a *Fire*, as that of the *Furnace*, as ſoon as ever it cooleth never ſo little, congealeth preſently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we ſee in *Chymicall* Trials. Briefly, moſt *Things Putrified* bring forth *Inſecta* of ſeverall Names; But we will not take upon us now to Enumerate them all.

697 The *Inſecta* have been noted by the *Ancients* to feed little: But this hath not been diligently obſerved; For *Graſhoppers* eat up the *Green* of whole *Countries*; And *Silk-Worms* devour *Leaves* ſwiftly; And *Ants* make great Proviſion. It is true, that *Creatures*, that ſleep and reſt much, Eat little, As *Dormice* and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Juyce* of their *Bodies*, is almoſt all one; Not *Bloud*, and *Fleſh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integral Parts* have Extreme Variety, but the *Similar Parts* little. It is true, that they have, (ſome of them,) *Diaphragme*, and an *Inteſtine*; And they have all *Skins*; Which in moſt of the *Inſecta* are caſt often. They are not (generally) of *long Life*: Yet *Bees* have been known to live ſeven years: And *Snakes* are thought the rather for the *Caſting* of their *Spoil*, to live till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will live and grow very long: And thoſe that Enterchange from *Worms* to *Flies* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, have been kept in Boxes four yeers at the leaſt. Yet there are certain *Flies* that are called *Ephemera*, that live but a day. The *Cauſe* is, the Exilitie of the *Spirit*; Or perhaps the Abſence of the *Sun*; For that if they were brought in, or kept cloſe, they might live longer. Many of the *Inſecta*, (as *Butterflies*, and other *Flies*,) revive eaſily, when they ſeem dead, being brought to the *Sun*, or *Fire*. The *Cauſe* whereof is, the *Diffuſion* of the *Vitall Spirit*, and the eaſie dilating of it by a little *Heat*. They ſtir a good while after their *Heads* are off, or that they be cut in Peeces; Which is cauſed alſo, for that their *Vitall Spirits* are more diffuſed thorow-out all their *Parts*, and leſſe confined to *Organs*, than in *Perfect Creatures*.

698 The *Inſecta* have *Voluntarie Motion*, and therefore *Imagination*; And whereas ſome of the *Ancients* have ſaid, that their *Motion* is indeterminate, and their *Imagination* Indefinite, it is negligently obſerved; For *Ants* go right forwards

forwards to their Hils; And *Bees* doe (admirably) know the way, from a Flowry Heath, two or three Miles off, to their Hives. It may be, *Gnats*, and *Flies*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have onely the *Sense* of *Feeling*; which is manifestly untrue; For if they goe forth right to a Place, they must needs have Sight: Besides, they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste*: And *Bees* are called with *Sound* upon *Brasse*, and therefore they have *Hearing*: Which sheweth likewise that though their *Spirits* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations *concerning the* Insecta, *together with the* Enumeration *of them, we referre to that place, where we meane to handle the* Title *of* Animal's *in generall.*

Experiment Solitary touching *Leaping*. 696

A *Man Leppeth* better with *Weights*, in his *Hands*, than without. The *Cause* is, for that the *Weight*, (if it be proportionable,) strengtheneth the *Sinewes*, by *Contracting* them. For otherwise, where no *Contraction* is needful, *Weight* hindreth. As we see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their Raise. *Quære*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were to breake forth with more Force: As *Breath* also drawne, and kept in, commeth forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater Swing, are first cast backward.

Experiment Solitary, touching the *Pleasures*, and *Displeasures* of the *Senses*, especially of *Hearing*. 700

OF *Musicall Tones*, and *Unequall Sounds*, we have spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching Noise*; make a *Shivering* or *Horrour* in the *Body*, and set the *Teeth* on edge. The *Cause* is, for that the *Objects* of the *Eare*, doe affect the *Spirits* (immediately) most with *Pleasure* and Offence. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There be *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odious*, or *Fearfull*; But the same *Things Painted* do little affect. As for *Smels*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a Roundnesse and *Equallity*; And if they be Harsh, are *Unequall*: For a *Discord* it selfe is but a *Harshnesse* of *Divers Sounds Meeting*. It is true, that *Inequality*, not Stayed upon, but Passing, is rather an Encrease of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucity* of a *Trumpet*; And in the *Nightinghale-Pipe* of a *Regall*; And in a *Discord* straight falling upon a *Concord*: But if you stay upon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*, and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by divers Names, as *Skriching*, or *Grating*, such as we now speake of. As for the *Setting* of the *Teeth* on *Edge*, we plainly see what an Intercourse there is, between the *Teeth*, and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, between the *Teeth*, and *Striking* upon the *String*.

NATURALL HISTORY.

VIII. Century.

THere be *Minerals*, and *Foſsiles*, in great Variety; but of *Veines* of *Earth Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Arminus*: Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing* of *Wonnds*, *Stanching* of *Bloud*, *Stopping* of *Fluxes* and *Rheumes*, and *Arreſting* the *Spreading* of *Poyſon*, *Infection*, and *Putrefaction*: And they have of all other *Simples*, the Perfecteſt and Pureſt *Quality* of *Drying*, with little or no Mixture of any other *Quality*. Yet it is true, that the *Bole-Arminick* is the moſt *Cold* of them; And that *Terra-Lemnia* is the moſt *Hot*; For which cauſe the *Iſland Lemnos*, where it is digged; was in the Old *Fabulous Ages* conſecrated to *Vulcan*.

Experiment Solitary, touching *Veines* of *Medicinall Earth*. 701

ABout the *Bottome* of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the ſides of *Rockes*, being as it were a large, but tough, *Moſſe*. It is the more to be noted, becauſe that there be but few *Subſtances*, *Plant-like*, that grow deep within the *Sea*; For they are gathered ſometimes fifteen Fathome deepe; And when they are laid on Shoare, they ſeeme to be of great Bulke; But cruſhed together, will be tranſported in a very ſmall Roome.

Experiment Solitary touching the *Growth* of *Sponges*. 702

IT ſeemeth that *Fiſh*, that are uſed to the *Salt-Water*, doe nevertheleſſe delight more in *Freſh*. We ſee, that *Salmons*, and *Smelts* love to get into *Rivers*, though it be againſt the *Stream*. At the *Haven* of *Conſtantinople*, you ſhal have great *Quantities* of *Fiſh* that come from the *Euxine-Sea*; that when they come into the *Freſh-Water*, doe inebriate and turne up their *Bellies*; So as you may take them with your Hand. I doubt, there hath not been ſufficient *Ex-*

Experiment Solitary touching *Sea-Fiſh* put in *Freſh Waters*. 703

periment made of Putting *Sea-Fiſh* into *Freſh Water*, *Ponds*, and *Pooles*. It is a Thing of great Uſe, and Pleaſure: For ſo you may have them new at ſome good diſtance from the *Sea*: And beſides, it may bee, the *Fiſh* will eat the pleaſanter, and may fall to breed: And it is ſaid, that *Colcheſter Oyſters*, which are put into Pits, where the *Sea* goeth and commeth, (but yet ſo, that there is a *Freſh Water* comming alſo to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment Solitary, touching *Attraction* by *Similitude* of *Subſtance*. 704

THe *Turkiſh-Bow* giveth a very Forcible *Shoot*; Inſomuch as it hath beene knowne, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Braſſe* of two Inches thicke: But that which is more ſtrange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a Peece of *Wood*, of eight Inches thicke. And it is certaine, that we had in uſe at one time, for *Sea-Fight*, ſhort *Arrowes*, which they called *Sprights*, without any other Heads, ſave *Wood* ſharpened; which were diſcharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce. But this dependeth upon one of the greateſt *Secrets* in all *Nature*; Which is, that *Similitude* of *Subſtance* will cauſe *Attraction*, where the Body is wholly freed from the *Motion* of *Gravity*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the help of the *Load-Stone*. But this ſame *Motion* of *Weight* or *Gravity*, (which is a meere *Motion* of the *Matter*, and hath no Affinity with the *Form*, or *Kinde*,) doth kill the other *Motion*, except it ſelfe be killed by a violent *Motion*; And in theſe *Inſtances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Subſtance*, beginneth to ſhew it ſelfe. But we ſhall handle this Point of *Nature* fully in due Place.

Experiment Solitary, touching certaine *Drinks* in *Turkey*. 705

THey have in *Turkey*, and the *Eaſt*, certaine *Confections*, which they call *Servets*, which are like to *Candied Conſerves*, And are made of *Sugar* and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and ſome other Flowers; And ſome Mixture of *Amber* for the more delicate Perſons; And thoſe they diſſolve in *Water*, and thereof make their *Drinke*, becauſe they are forbidden *Wine* by their *Law*. But I doe much marveil, that no *Engliſhman*, or *Dutchman*, or *German*, doth ſet up *Brewing* in *Conſtantinople*; Conſidering they have ſuch Quantity of *Barley*. For as for the generall Sort of *Men*, Frugality may be the *Cauſe* of *Drinking Water*; For that it is no ſmall Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Coſt. And yet I wonder the leſſe at it, becauſe I ſee *France*, *Italy*, or *Spaine*, have not taken into uſe, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that ſhould begin it in *Turkey*.

Experiments in Conſort, touching *Sweat*. 706

IN *Bathing* in *Hot Water*, *Sweat* (nevertheleſſe) commeth not in the *Parts* under the *Water*. The *Cauſe* is; Firſt, for that *Sweat* is a Kinde of *Colliquation*. And that Kinde of *Colliquation* is not made, either by an *Over-Drie Heat*, or an *Over-Moiſt Heat*. For *Over-Moiſture* doth ſomewhat extinguiſh the *Heat*; As we ſee that even *Hot Water* quencheth *Fire*: And *Over-Drie Heat* ſhutteth the *Pores*: And therefore *Men* will ſooner *Sweat* covered before the *Sunne*, or *Fire*, than if they ſtood naked; And *Earthen Bottles*, filled with *Hot Water*, doe provoke, in Bed, a *Sweat* more daintily, than *Brick-Bats Hot*. Secondly. *Hot Water* doth cauſe *Evapouration* from the *Skin*; So as it ſpendeth the Matter, in thoſe Parts under the *Water*, before it iſſueth in *Sweat*.

Sweat. Againe, *Sweat* commeth more plentifully, if the *Heat* bee increased by *Degrees*, than if it be greatest at first, or equall. The *Cause* is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they provoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorifick Herbs*, in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *lesse Heated* first, and after halfe an Hour the *more Heated.*

707 *Sweat* is *Salt* in Taste; the *Cause* is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Blood* and *Flesh*; And the *Sweat* is onely that *Part*, which is *Separate*, and *Excerned. Blood* also Raw, hath some *Saltnesse*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Blood.*

708 *Sweat* commeth forth more out of the *Upper Parts* of the *Body*, than the *Lower*; The *Reason* is, because those *Parts* are more repleniſhed with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Drie*; As the *Forehead*, and *Breast.*

709 Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleep* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The *Cause* is, for that in *Sleepe*, the *Heat*, and *Spirits* doe naturally move inwards, and there rest. But when they are collected once within, the *Heat* becommeth more Violent, and Irritate; And thereby expelleth *Sweat.*

710 *Cold Sweats* are (many times) *Mortall*, and neare *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The *Cause* is, for that *Cold Sweats* come by a *Relaxation*, or *Forsaking* of the *Spirits*, whereby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out.

711 In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Critticall*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body.*

Experiment Solitary, touching the *Glo-worme.*

712 THe *Nature* of the *Glo-worme* is hitherto not well observed. Thus much we see; That they breed chiefly in the *Hottest Monethes* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges.* Whereby it may be conceived, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the Fineness, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Flie* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme.* But that *Flie* is chiefly upon *Fens*, and *Marrishes.* But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greene* of the *Fens*, give as good Shade, as *Bushes.* It may be the *Glo-wormes* of the *Cold Countries* ripen not so far as to be *Winged.*

Experiments in Consort, touching the *Impressions*, which the *Passions* of the *Minde* make upon the *Body.*

713 THe *Passions* of the *Minde*, worke upon the *Body* the *Impressions* following. *Feare* causeth *Paleness*; *Trembling*; The *Standing* of the *Haire* upright;

right; *Starting*; and *Scritching*. The *Paleneſſe* is cauſed, for that the *Bloud* runneth inward to ſuccour the *Heart*. The *Trembling* is cauſed, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are deſtituted, and not ſuſtained. *Standing upright* of the *Haire* is cauſed, for that by *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth aſloape, muſt needs Riſe. *Starting* is both an *Apprehenſion* of the *Thing feared*; (And, in that kinde, it is a *Motion* of *Shrinking*;) And likewiſe an *Inquiſition*, in the beginning, what the Matter ſhould be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would liſten ſuddenly to any Thing, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritching* is an *Appetite* of *Expelling* that which ſuddenly ſtriketh the *Sprits*: For it muſt be noted, that many *Motions*, though they bee unprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cauſe *Motions* by *Conſent*; As in *Groaning*, or *Crying* upon *Paine*.

714 *Griefe*, and *Paine* cauſe *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Diſtorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is cauſed by the *Drawing* in of a greater *Quantity* of *Breath* to refreſh the *Heart* that laboureth: like a great *Draught* when one is thirſty. *Sobbing* is the ſame Thing ſtronger. *Groaning*, and *Screaming*, and *Roaring*, are cauſed by an *Appetite* of *Expulſion*, as hath been ſaid: For when the *Spirits* cannot expell the Thing that hurteth, in their Strife to doe it, by *Motion* of *Conſent*, they expell the *Voyce*. And this is, when the *Spirits* yeeld, and give over to reſiſt; For if one doe conſtantly reſiſt *Paine*, he will not groane. *Teares* are cauſed by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by conſequence aſtringeth the *Moiſture* of the *Braine*, and thereby ſendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compreſſion* cauſeth alſo *Wringing* of the *Hands*: For *Wringing* is a *Geſture* of *Expreſſion* of *Moiſture*. The *Diſtorting* of the *Face* is cauſed by a *Contention*, firſt to beare and reſiſt, and then to expell; Which maketh the Parts knit firſt, and afterwards open. *Grinding* of the *Teeth* is cauſed (likewiſe) by a *Gathering* and *Serring* of the *Spirits* together to reſiſt; Which maketh the *Teeth* alſo to ſet hard one againſt another. *Sweating* is alſo a *Compound Motion* by the *Labour* of the *Spirits*, firſt to reſiſt, and then to expell.

715 *Joy* cauſeth a *Chearfulneſſe* and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And ſometimes *Teares*. All theſe are the effects of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Lively*, and *Stirring*. We know it hath been ſeen, that *Exceſſive ſudden Joy* hath cauſed *Preſent Death*, while the *Spirits* did ſpread ſo much, as they could not retire againe. As for *Teares*, they are the Effects of *Compreſſion* of the *Moiſture* of the *Braine*, upon *Dilatation* of the *Spirits*. For *Compreſſion* of the *Spirits* worketh an *Expreſſion* of the *Moiſture* of the *Braine*, by *Conſent*, as hath been ſaid in *Griefe*. But then in *Joy*, it worketh it diverſly; *viz.* by *Propulſion* of the *Moiſture*, when the *Spirits* dilate, and occupie more Roome.

716 *Anger* cauſeth *Paleneſſe* in ſome, and the *Going* and *Comming of the Colour* in Others: Alſo *Trembling* in ſome; *ſwelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fiſt*. *Paleneſſe*, and *Going*, and *Comming* of the *Colour*, are cauſed by the *Burning* of the *Spirits* about the *Heart*; Which to refreſh themſelves, call in more *Spirits* from the *Outward Parts*. And if the *Paleneſſe* be alone, without *Sending forth* the *Colour* againe, it is commonly joyned with ſome *Feare*, but in many there is no *Paleneſſe* at all, but contrariwiſe *Redneſſe* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the

Spirits

Spirits in an *Appetite* to *Revenge*. *Trembling* in *Anger* is likewiſe by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is joyned with *Feare*. *Swelling* is cauſed, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the ſame *Cauſe*, being an *Ebullition*; *Stamping*, and *Bending* of the *Fiſt*, are cauſed by an *Imagination* of the *Act* of *Revenge*.

Light Diſpleaſure or *Diſlike*, cauſeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. Theſe *Effects* ariſe from the ſame *Cauſes* that *Trembling*, and *Horrour* doe; Namely, from the *Retiring* of the *Spirits*, but in a leſſe degree. For the *Shaking* of the *Head* is but a Slow and Definite *Trembling*; And is a *Geſture* of *Slight Refuſall*: And we ſee alſo, that a *Diſlike* cauſeth (often) that *Geſture* of the *Hand*, which we uſe, when we refuſe a Thing, or warne it away. The *Frowning* aud *Knitting* of the *Browes*, is a *Gathering*, or *Serring* of the *Spirits*, to reſiſt in ſome Meaſure. And we ſee alſo, this *Knitting* of the *Browes* will follow upon earneſt *Studying*, or *Cogitation* of any Thing, though it be without *Diſlike*. 717

Shame cauſeth *Bluſhing*; And *Caſting Downe* of the *Eyes*. *Bluſhing* is the *Reſort* of *Bloud* to the *Face*; Which in the *Paſsion* of *Shame*, is the *Part* that laboureth moſt. And although the *Bluſhing* will be ſeen in the whole *Breaſt*, if it be Naked, yet that is but in Paſſage to the *Face*. As for the *Caſting downe* of the *Eyes*, it proceedeth of the *Reverence* a Man beareth to other Men; Whereby, when he is aſhamed, he cannot endure to looke firmely upon Others: And we ſee, that *Bluſhing*, and the *Caſting downe* of the *Eyes* both, are more when we come before Many; *Ore Pompeii quid mollius? Nunquam non coram pluribus erubuit*: And likewiſe when we come before *Great*, or *Reverend Perſons*. 718

Pitty cauſeth ſometimes *Teares*; And a *Flexion* or *Caſt* of the *Eye aſide*. *Teares* come from the ſame *Cauſe* that they doe in *Griefe*: for *Pitty* is but *Griefe* in Anothers Behalfe. The *Caſt* of the *Eye* is a *Geſture* of *Averſion*, or *Lothneſſe* to behold the *Object* of *Pitty*. 719

Wonder cauſeth *Aſtoniſhment*, or an *Immoveable Poſture* of the *Body*; *Caſting* up of the *Eyes* to *Heaven*; And *Lifting* up of the *Hands*. For *Aſtoniſhment*, it is cauſed by the *Fixing* of the *Minde* upon one *Object* of *Cogitation*, whereby it doth not ſpatiate and tranſcurre, as it uſeth: For in *Wonder* the *Spirits* flie not, as in *Feare*; But onely ſettle, and are made leſſe apt to move. As for the *Caſting* up of the *Eyes*, and *Lifting* up of the *Hands*, it is a *Kinde* of *Appeale* to the *Deity*; Which is the *Authour*, by *Power*, and *Providence*, of *Strange Wonders*. 720

Laughing cauſeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulſion* of the *Breath*, with the loud *Noiſe*, which maketh the *Interjection* of *Laughing*; *Shaking* of the *Breaſt*, and *Sides*; *Running* of the *Eyes* with *Water*, if it be Violent, and Continued. Wherein firſt it is to be underſtood, that *Laughing* is ſcarce (properly) a *Paſsion*, but hath his *Source* from the *Intellect*; For in *Laughing* there ever precedeth a *Conceit* of ſomewhat *Ridiculous*. And therefore it is Proper to *Man*. Secondly, that the *Cauſe* of *Laughing* is but a *Light Touch* of the *Spirits*, and not ſo deepe an *Impreſſion* as in other *Paſsions*. And therefore, (that which hath no *Affinity* with the *Paſsions* of the *Minde*,) it is moved, and that in great vehemency, onely by *Tickling* ſome *Parts* of the *Body*: And we ſee that *Men* even in a *Grieved State* of *Minde*, yet cannot ſometimes forbeare *Laughing*. Thirdly, it is ever joyned with ſome *Degree* of *Delight*: And therefore *Exhilaration* hath ſome *Affinity* with *Joy*, though it be a much *Lighter Motion*: *Res ſeverа eſt verum Gaudium*. 721

dium. Fourthly, that the *Object* of it is *Deformity*, *Abſurdity*, *Shrewd Turnes*, and the like. Now to ſpeake of the *Cauſes* of the *Effects* before mentioned, whereunto theſe *Generall Notes* give ſome *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulſion* of the *Breath* and *Voyce*, and *Shaking* of the *Breaſt* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Eſpecially being Sudden. So likewiſe, the *Running* of the *Eyes* with *Water*, (as hath been formerly touched, where we ſpake of the *Teares* of *Joy* and *Griefe*,) is an Effect of *Dilatation* of the *Spirits*. And for *Suddenneſſe*, it is a great *Part* of the *Matter*: For we ſee, that any *Shrewd Turne* that lighteth upon Another; Or any *Deformity*, &c. moveth *Laughter* in the Inſtant; Which after a little time it doth not. So we cannot *Laugh* at any thing after it is *Stale*, but whileſt it is *New*: And even in *Tickling*, if you *Tickle* the *Sides*, and give warning; Or give a *Hard*, or *Continued Touch*, it doth not move *Laughter* ſo much.

722 *Luſt* cauſeth a *Flagrancy* in the *Eyes*; and *Priapiſme*. The *Cauſe* of both theſe is, for that in *Luſt*, the *Sight*, and the *Touch*, are the Things deſired: And therefore the *Spirits* reſort to thoſe parts, which are moſt affected. And note well in generall, (for that great Uſe may be made of the *Obſervation*,) that (evermore) the *Spirits* in all *Paſſions*, reſort moſt to the *Parts*, that labour moſt, or are moſt affected. As in the laſt, which hath been mentioned, they reſort to the *Eyes*, and *Venereous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Diſlikes* to the *Head*.

Experiments in Conſort, touching *Drunkenneſſe*.

IT hath been obſerved by the *Ancients*, and is yet beleeved, that the *Sperme* of *Drunken Men* is *Unfruitfull*. The *Cauſe* is, for that it is *Over-moiſtened*, and wanteth *Spiſſitude*. And wee have a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*.

723

724 *Drunken Men* are taken with a plaine *Defect*, or *Deſtitution* in *Voluntary Motion*. They Reele; They tremble; They cannot ſtand, nor ſpeak ſtrongly. The *Cauſe* is, for that the *Spirits* of the *Wine*, oppreſſe the *Spirits Animall*, and occupate Part of the Place, where they are; And ſo make them Weake to move. And therefore *Drunken Men* are apt to fall aſleep: And *Opiates*, and *Stupefactives*, (as *Poppy*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkenneſſe*, by the *Groſſeneſſe* of their *Vapour*; as *Wine* doth by the *Quantity* of the *Vapour*. Beſides, they rob the *Spirits Animall* of their *Matter*, whereby they are nouriſhed: For the *Spirits* of the *Wine* prey upon it, as well as they: And ſo they make the *Spirits* leſſe Supple, and Apt to move.

725 *Drunken Men* imagine every *Thing turneth round*; They imagine alſo that *Things come upon them*; They *See* not well *Things afarre off*; Thoſe Things that they *See neare hand*, they *Set out of their place*; And (ſometimes) they *ſee Things double*. The *Cauſe* of the Imagination that *Things turne Round*, is, for that the *Spirits* themſelves turne, being compreſſed by the *Vapour* of the *Wine*: (For any *Liquid Body* upon *Compreſſion*, turneth, as we ſee in *Water*:) And it is all one to the *Sight*, whether the *Viſuall Spirits* move, or the *Object* moveth, or the *Medium* moveth. And we ſee that long *Turning Round* breedeth the ſame Imagination. The *Cauſe* of the Imagination that *Things come upon them*, is, for that the *Spirits Viſuall* themſelves draw backe; which maketh the *Object* ſeeme to come on. And beſides, when they ſee Things turne Round, and Move, *Feare* maketh them thinke they come upon them. The *Cauſe* that they cannot ſee *Things afarre off*, is the *Weakneſſe* of the *Spirits*, for in every *Megrim*, or *Vertigo*, there is an *Obtenebration* joyned with a Semblance of *Turning Round*; Which we ſee alſo in the lighter Sort of *Swonnings*.

nings. The *Cauſe* of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Viſuall*; For the *Vapour* is as an *Unequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The *Cauſe* of *Seeing Things double*, is, the *Swift* and *Unquiet Motion* of the *Spirits*, (being Oppreſſed,) to and fro; For, (as was ſaid before,) the *Motion* of the *Spirits Viſuall*, and the *Motion* of the *Object*, make the ſame *Appearances*; And for the *Swift Motion* of the *Object*, we ſee, that if you fillip a *Lute-String*, it ſheweth double, or Treble.

726 *Men* are ſooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebrieateth leſſe, than *Wine Pure*. The *Cauſe* of the Former is, for that the *Wine* deſcendeth not ſo faſt to the *Bottome* or the *Stomach*; But maketh longer Stay in the *Upper Part* of the *Stomach*, and ſendeth *Vapours* faſter to the *Head*; And therefore inebrieateth ſooner. And, for the ſame Reaſon, *Sops* in *Wine*, (Quantity for Quantity,) inebriate more, than *Wine* of it ſelfe. The *Cauſe* of the Latter is, for that the *Sugar* doth inſpiſſate the *Spirits* of the *Wine*, and maketh them not ſo eaſie to reſolve into *Vapour*. Nay further, it is thought, to be ſome Remedy againſt *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the ſame Effect is wrought either by *Oyle*, or *Milke*, taken upon much *Drinking*.

Experiment Solitary touching the Help or Hurt of *Wine*, though *Moderately uſed*.

The *Uſe* of *Wine*, in *Drie*, and *Conſumed Bodies*, is hurtfull; In *Moiſt*, and *Full Bodies*, it is good. The *Cauſe* is, for that the *Spirits* of the *Wine* doe prey upon the *Dew*, or *Radicall Moiſture*, (as they terme it,) of the *Body*, and ſo deceive the *Animall Spirits*. But where there is *Moiſture* Enough, or Superfluous, there *Wine* helpeth to diſgeſt, and deſiccate the *Moiſture*.

727 Experiment Solitary touching *Catterpillers*.

The *Catterpiller* is one of the moſt Generall of *Wormes*, and breedeth of *Dew*, and *Leaves*; For we ſee infinite Number of *Catterpillers*, which breed upon *Trees*: and *Hedges*; By which the *Leaves* of the *Trees*, or *Hedges*, are in great Part conſumed; As well by their Breeding out of the *Leafe*, as by their Feeding upon the *Leafe*. They breed in the *Spring* chiefly, becauſe then there is both *Dew*, and *Leafe*. And they breed commonly when the *Eaſt Winds* have much blowne: The *Cauſe* whereof is, the *Drineſſe* of that *Wind*: For to all *Vivification* upon *Putrefaction*, it is requiſite the *Matter* be not too *Moiſt*: And therefore we ſee, they have *Copwebs* about them, which is a ſigne of a *Slimy Drineſſe*: As we ſee upon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all over. We ſee alſo the *Greene Catterpiller* breedeth in the Inward Parts of *Roſes*, eſpecially not blowne, where the *Dew* ſticketh: But eſpecially *Catterpillers*, both the greateſt, and the moſt, breed upon *Cabbages*; which have a *Fat Leafe*, and apt to *Putrifie*. The *Catterpiller* toward the *End* of *Summer* waxeth *Volatile*, and turneth to a *Butterflie*, or perhaps, ſome other *Fly*. There is a *Catterpiller*, that hath a *Furre*, or *Downe* upon him, and ſeemeth to have Affinity with the *Silke-worme*.

728 Experiment Solitary touching the *Flies Cantharides*.

The *Flies Cantharides* are bred of a *Worme*, or *Catterpiller*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-Tree*, the *Pine-Tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of ſecret *Biting*, or *Sharpneſſe*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corroſive*. The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abſterſive*: The *Fruit* of the *Briar* is ſaid to make *Children*, or thoſe that Eat them, *Scabbed*. And therefore, no marveil though *Cantharides* have ſuch a *Corroſive*, and *Cauterizing Quality*; For there is not one other of the *Inſecta*, but is bred of a *Duller Matter*. The *Body* of the *Cuntharides* is bright couloured; And it may be,

be, that the delicate-coloured *Dragon-Flies*, may have likewiſe ſome *Corroſive Quality*.

Experiments in Conſort, touching *Laſſitude*.

73°

Laſſitude is remidied by *Bathing*, or *Annointing* with *Oyle*, and *Warme Water*. The *Cauſe* is, for that all *Laſſitude* is a kinde of *Contuſion*, and *Compreſſion* of the *Parts*; And *Bathing*, and *Annointing* give a *Relaxion*, or *Emollition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Becauſe *Water* Entreth better into the *Pores*, and *Oyle* after Entry ſoftneth better. It is found alſo, that the *Taking* of *Tobacco* doth helpe and diſcharge *Laſſitude*. The Reaſon whereof is, partly, becauſe by Chearing or Comforting of the *Spirits*, it openeth the *Parts Compreſſed*, or *Contuſed*: And chiefly, becauſe it refreſheth the *Spirits* by the *Opiate Vertue* thereof; And ſo diſchargeth *Wearineſſe*; as *Sleepe* likewiſe doth.

731

In *Going up a Hill*, the *Knees* will be moſt *Weary*; In *Going down a Hill*, the *Thighes*. The *Cauſe* is, for that in the *Lift* of the *Feet*, when a Man *Goeth up the Hill*, the Weight of the *Body* beareth moſt upon the *Knees*; And in *Going downe the Hill*, upon the *Thighes*.

Experiment Solitary touching the *Caſting* of the *Skin*, and *Shell* in ſome *Creatures*.

732

THe *Caſting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Caſting* of the *Skin* a New *Birth*: And beſides, the *Secundine* is but a generall *Cover*, not ſhaped according to the *Parts*; But the *Skin* is ſhaped according to the *Parts*. The *Creatures*, that caſt their *Skin*, are; The *Snake*, the *Viper* the *Graſhopper*, the *Lizard*, the *Silke-worme*, &c. Thoſe that caſt their *Shell*, are; The *Lobſter*, the *Crab*, the *Craſiſh*, the *Hodmandod*, or *Dodman*, the *Tortoiſe*, &c. The *Old Skins* are found, but the *Old-Shels* never: So as it is like, they ſcale off, and crumble away by degrees. And they are knowne by the Extreame *Tenderneſſe* and *Softneſſe* of the *New Shell*; And ſomewhat by the *Freſhneſſe* of the *Colour* of it. The *Cauſe* of the *Caſting* of *Skin*, and *Shell*, ſhould ſeeme to be the great *Quantity* of *Matter* in thoſe *Creatures*, that is fit to make *Skin* or *Shell*; And againe, the *Looſeneſſe* of the *Skin*, or *Shell*, that ſticketh not cloſe to the *Fleſh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we ſee, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And ſo *Birds* that have much *Matter* for their *Beake*, caſt their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments in Conſort, touching the *Poſtures* of the *Body*.

733

LYing, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered up*, which is in the Poſture of the Body, is the more Wholeſome. The *Reaſon* is, the better *Comforting* of the *Stomach*, which is by that leſſe Penſile: And we ſee, that in Weake *Stomachs*, the Laying up of the Legs high, and the Knees almoſt to the Mouth, helpeth, and comforteth. We ſee alſo that *Gally-Slaves*, notwithſtanding their Miſerie otherwiſe, are commonly Fat and Fleſhy; And the Reaſon is, becauſe the *Stomach* is ſupported ſomewhat in *Sitting*; And is Penſile in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to chooſe thoſe *Exerciſes*, where the *Limbs* move more than the *Stomach*, and Belly; As in *Rowing*, and in *Sawing*, being *Set*.

734

Megrims and *Giddineſſe* are rather when we *Riſe*, after long *Sitting*, than while we *Sit*. The *Cauſe* is, for that the *Vapours*, which were gathered by *Sitting*, by the Sudden *Motion*, flie more up into the *Head*.

735

Leaning long upon any *Part* maketh it *Numme*, and, as we call it, Aſleepe.

The

The *Cauſe* is, for that the *Compreſsion* of the *Parts* ſuffereth not the *Spirits* to have free Acceſſe; And therefore when we come out of it, we feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

IT hath been noted, that thoſe *Yeares* are *Peſtilentiall*, and *Unwholeſome*, when there are great Numbers of *Frogs*, *Flies*, *Locuſts*, &c. The *Cauſe* is plaine; For that thoſe *Creatures* being ingendred of *Putrefaction*, when they abound, ſhew a generall *Diſpoſition* of the *Yeare*, and *Conſtitution* of the *Aire*, to *Diſeaſes* of *Putrefaction*. And the ſame *Prognoſticke*, (as hath beene ſaid before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Conſtitution* of the *Aire*, appeareth more ſubtilly, in any of theſe *Things*, than to the *Senſe* of *Man*.

Experiment Solitary touching *Peſtilentiall Yeares*. 736

IT is an Obſervation amongſt *Countrey People*, that *Yeares* of *Store* of *Hawes* and *Heps*, doe commonly portend *Cold Winters*; And they aſcribe it to *Gods Providence*, that, (as the *Scripture* ſaith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preſervation* of *Birds* in ſuch *Seaſons*. The *Naturall Cauſe* alſo may be the *Want* of *Heat*, and *Abundance* of *Moiſture*, in the *Summer* precedent; Which putteth forth thoſe *Fruits*, and muſt needs leave great *Quantity* of *Cold Vapours*, not diſſipate; Which cauſeth the *Cold* of the *Winter* following.

Experiment Solitary, touching the *Prognoſticks* of *Hard Winters*. 737

THey have in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the ſame Name, as Blacke as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can *Drinke* it: And they take it, and ſit at it in their *Coffa-Houſes*, which are like our *Tavernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Diſgeſtion*. Certainly this *Berry-Coffa*; The *Root*, and *Leafe Betell*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*) of which the *Turkes* are great Takers, (ſuppoſing it expelleth all Feare;) doe all Condenſe the *Spirits*, and make them Strong, and Aleger. But it ſeemeth they are taken after ſeverall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betell* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quere* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, Root, and Flower; Of *Folium Indum*; Of *Amber-grice*; Of the *Aſſyrian Amomum*, if it may be had; And of the *ſcarlet Powder*, which they call *Kermez*; And (generally) of all ſuch Things, as doe inebriate and provoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible ever than *Leaves*.

Experiment Solitary touching *Medicines* that *Condenſe*, and *Relieve* the *Spirits*. 738

THe *Turkes* have a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long Pencill they lay under their *Eye-Lids*; Which doth colour them Blacke, Whereby the *White* of the *Eye* is ſet off more *white*. With the ſame *Powder* they colour alſo the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You ſhall finde that *Xenophon* maketh Mention, that the *Medes* uſed to paint their *Eyes*. The *Turkes* uſe with the ſame *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And divers with us, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* black, by Combing it, (as they ſay,) with a Leaden Combe, or the like. As for the *Chineſes*, who are of an ill Complexion, (being Olivaſter,) they paint their *Cheekes* Scarlet; Eſpecially their *King*, and *Grandees*. Generally, *Barbarous People*, that goe Naked,

Experiment Solitary touching *Paintings* of the *Body*. 739

Naked, doe not onely paint Themſelves, but they pownce and raze their Skinne, that the *Painting* may not be taken forth; And make it into Works. So doe the *Weſt-Indians*; And ſo did the Ancient *Picts*, and *Brittons*; So that it ſeemeth, *Men* would have the *Colours* of *Birds Feathers*, if they could tell how, Or at leaſt, they will have *Gay Skins*, in ſtead of *Gay Clothes*.

Experiment Solitary touching the *Uſe* of *Bathing* and *Annointing*. 740

IT is ſtrange, that the *uſe* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and the *Grecians*, it was as uſuall, as *Eating*, or *Sleeping*: And ſo is it amongſt the *Turkes* at this day: Whereas with us it remaineth but as a *Part* of *Phyſicke*. I am of Opinion, that the Uſe of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and eaſie to Waſte. For the *Turkes* it is more proper, becauſe of their *Drinking Water*, and *Feeding* upon *Rize*, and other Food of ſmall Nouriſhment, maketh their *Bodies* ſo Solide, and Hard, as you need not feare that *Bathing* ſhould make them *Froathy*. Beſides, the *Turkes* are great *Sitters*, and ſeldome walke; Whereby they Sweat leſſe, and need *Bathing* more. But yet certaine it is, that *Bathing*, and eſpecially *Annointing*, may be ſo uſed, as it may be a great Help to *Health*, and *Prolongation* of *Life*. But hereof we ſhall ſpeake in due Place, when we come to handle *Experiments Medicinall*.

Experiment Solitary touching *Chameletting* of *Paper*. 741

THe *Turks* have a Pretty Art of *Chameletting* of *Paper*, which is not with us in uſe. They take divers *Oyled Colours*, and put them ſeverally (in drops) upon *Water*; And ſtirre the *Water* lightly; And then wet their *Paper*, (being of ſome Thickneſſe,) with it; And the *Paper* will be Waved, and Veined, like *Chamolet*, or *Marble*.

Experiment Solitary touching *Cuttle-Inke*. 742

IT is ſomewhat ſtrange, that the *Bloud* of all *Birds*, and *Beaſts*, and *Fiſhes*, ſhould be of a *Red Colour*, and onely the *Bloud* of the *Cuttle* ſhould be as *Black* as *Inke*. A Man would thinke, that the *Cauſe* ſhould be the *High Concoction* of that *Bloud*; For we ſee in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Black*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Requeſt.

Experiment Solitary, touching *Encreaſe* of *Weight* in *Earth*. 743

IT is reported of Credit, that if you take *Earth*, from Land adjoyning to the *River* of *Nile*; And preſerve it in that manner, that it neither come to be Wet, nor Waſted; And Weigh it daily, it will not alter *Weight* untill the ſeventeenth of *June*, which is the Day when the *River* beginneth to riſe; And then it will grow more and more *Ponderous* till the *River* commeth to his Heighth. Which if it be true, it cannot be cauſed, but by the *Aire*, which then beginneth to Condenſe; And ſo turneth within that Small *Mould* into a degree of *Moiſture*; Which produceth *Weight*. So it hath beene obſerved, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loſeth Weight; and after being laid in the open *Aire*, recovereth *Weight* againe. And it ſhould ſeeme, that as ſoone as ever the *River* beginneth to increaſe, the whole *Body* of the *Aire* thereabouts ſuffereth a Change: For (that which is more ſtrange,) it is credibly affirmed, that upon that very Day, when the *River* firſt riſeth, great *Plagues*, in *Cairo*, uſe ſuddenly to breake up.

Experiments in Conſort, touching *Sleep*. 744

THoſe that are very *Cold*, and eſpecially in their *Feet*, cannot get to *Sleepe*. The *Cauſe* may be, for that in *Sleepe* is required a *Free Reſpiration*, which *Cold* doth ſhut in, and hinder: For we ſee, that in great *Colds*, one can ſcarce draw

draw his *Breath*. Another *cause* may be, for that *cold* calleth the *Spirits* to succour; and therefore they cannot so well close, and goe together in the *Head*; which is ever requisite to *Sleepe*. And for the same Cause, Paine, and Noise hinder *Sleepe*; and *Darkness* (contrariwise) furthereth *Sleep*.

Some Noises (whereof we spake in the 112. *Experiment*) helpe *Sleep*; as the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming of Bees*, *Soft Singing*, *Reading*, &c. The Cause is, for that they move in the Spirits a gentle attention; and whatsoever moveth attention, without too much Labour, stilleth the Naturall and discursive *Motion* of the *Spirits*. 745

Sleep nourisheth, or at least preserveth Bodies, a long time, without other Nourishment. *Beasts* that Sleep in winter, (as it is noted of *wild Bears*,) during their *Sleep* wex very fat, though they eate nothing. *Bats* have been found in Ovens, and other Hollow close Places, Matted one upon another; and therefore it is likely that they Sleepe in the winter time, and eat nothing. *Quære*, whether *Bees* do not *Sleep* all winter, and spare their *Honey*? *Butterflies*, and other *Flies*, do not only *Sleep*, but lie as dead all winter; and yet with a little Heat of Sunne, or Fire, revive againe. A *Dormouse*, both Winter and Summer, will *Sleep* some dayes together, and eat Nothing. 746

To restore *Teeth* in *Age*, were *Magnale Naturæ*. It may bee thought of. But howsoever, the Nature of the *Teeth* deserveth to be inquired of, as well as the other Parts of *Living Creatures Bodies*.

Experiment in Consort, touching *Teeth* and *Hard Substances* in the *Bodies of Living Creatures*.

747

THere be Five *Parts* in the *Bodies* of *living Creatures*, that are of hard Substances; the *Skull*; the *Teeth*; the *Bones*; the *Horns*; and the *Nailes*. The greatest *Quantity* of Hard Substance continued, is towards the *Head*. For there is the *Skull* of one entire *Bone*; there are the *Teeth*; there are Maxillary *Bones*; there is the *hard bone*, that is the instrument of hearing; and thence issue the horns: So that the Building of *Living Creatures Bodies*, is like the Building of a *Timber-House*, where the walls, and other parts have Columns, and Beams; But the Roofe is, in the better sort of Houses, all Tile, or Lead, or Stone. As for *Birds*, they have three other hard Substances proper to them; The *Bill*, which is of the Like Matter with the *Teeth*; for no *Birds have Teeth*: the Shell of the Egge: and their Quills: for as for their Spurre, it is but a Naile. But no *Living Creatures*, that have *Shells* very hard; (as *Oysters*, *Cockles*, *Muscles*, *Shalops*, *Crabs*, *Lobsters*, *Cra-fish*, *Shrimps*, and especially the *Tortoise*,) have *Bones* within them, but only little *Gristles*.

Bones, after full growth, continue at a stay: and so doth the *Skull*: *Hornes*, in some *Creatures*, are cast, and renued: *Teeth* stand at a stay, except their wearing: as for *Nails*, they grow continually: and *Bills* and *Beaks* will over grow, and sometimes be cast, as in *Eagles*, and *Parrots*. 748

Most of the *Hard Substances* flie to the Extremes of the Body; as *Skull*, *Horns*, *Teeth*, *Nails*, and *Beaks*: Onely the *Bones* are more inward, and clad with *Flesh*. As for the *Entrailes*, they are all without *Bones*; save that a *Bone* is (sometimes) found in the *Heart of a Stag*, and it may be in some other *Creatures*. 749

The *Skull* hath *Brains*, as a kind of *Marrow*, within it. The *back-bone* hath one Kinde of *Marrow*, which hath an Affinity with the *braine*; and other *bones* of the *body* have another. The *Jaw-bones* have no *Marrow* Severed, but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to 750

have a kind of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more then *Bloud*. *Horne* is alike throughout; and so is the *Naile*.

751 None other of the *Hard Substances* have *Sense*, but the *Teeth*: and the *Teeth* have *Sense*, not only of *Paine*, but of *Cold*.

But we will leave the Enquiries *of other* Hard Substances, *unto their severall Places; and now enquire only of the* Teeth.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharpe*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; and *Pointed-Teeth*, or *Canine*, which are between both. But there have been some *Men*, that have had their *Teeth undivided*, as of one whole *Bone*, with some little Marke in the place of the Division; as *Pyrrhus* had. Some Creatures have *Over-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tuskes*; as *Boares*, *Pike*, *Salmons*, and *Dogs*, though lesse. Some *Living Creatures* have *Teeth* against *Teeth*; as *Men*, and *Horses*; and some have *Teeth*, especially their *Master Teeth*, indented one within another, like *Sawes*; as *Lions*; and so againe have *Dogs*. Some *Fishes* have divers Rowes of *Teeth* in the Roofes of their *Mouthes*; as *Pikes*, *Salmonds*, *Trouts*, &c. And many more in Salt-waters. *Snakes*, and other *Serpents* have *Venemous Teeth*; which are sometimes mistaken for their *Sting*.

753 No *Beast* that hath *Hornes*, hath *Upper Teeth*; and no *Beast*, that hath *Teeth* above, wanteth them below: But yet if they be of the same kind, it followeth not, that if the Hard Matter goeth not into *Upper Teeth*, it will goe into *Hornes*; Nor yet *è converso*; For *Doe's*, that have no *Horns*, have no *Upper Teeth*.

754 *Horses* have, at three years old, a *Tooth* put forth, which they call the *Colts Tooth*; and at foure yeares old there commeth the *Marke-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; and that weareth shorter and shorter, every yeare, till that at eight years old, the *Tooth* is smooth, and the *hole* gone; and then they say; *That the Marke is out of the Horses Mouth*.

755 The *Teeth* of *Men* breed first, when the Child is about a yeare and halfe Old: and then they cast them, and new come about seven yeares old. But divers have *Backward-Teeth* come forth at twenty, yea some at thirty, and forty. *Quere* of the manner of the Comming of them forth. They tell a tale of the old *Countesse* of *Desmond*, who lived till she was seven-score yeares old; that she did *Dentire* twice, or thrice; Casting her old *Teeth*, and others Comming in their Place.

756 *Teeth* are much hurt by *Sweet-meats*; and by Painting with *Mercury*; and by things over-hot; and by things over-cold; and by *Rhuems*. And the paine of the *Teeth*, is one of the sharpest of Pains.

757 Concerning *Teeth*, these things are to be Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with Least Paine. 4. The *Staying* and *Easing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have been stucken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The instances that give any likelihood of *Restoring Teeth* in *Age*, are; the Late Comming of *Teeth* in some; and the *Renewing* of the *Beaks* in *Birds*, which are Commatericall with *Teeth*. *Quere* therefore more particularly how that Commeth. And againe; The *Renewing* of *Hornes*. But yet that hath not beene Knowne to have beene provoked by art; Therefore let *triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether

they may be procured to come *Larger* than usuall; As to make an *Oxe*, or a *Deer*, have a greater *Head* of *Hornes*? And whether the *Head* of a *Deer* that by age is more *Spitted*, may bee brought againe to be more *Branched*? For these *Trialls*, and the like, will shew, whether by Art such *Hard Matter* can be called, and provoked. It may be tried also, whether *Birds* may not have something done to them when they are *Young*; whereby they may bee made to have *Greater*, or *Longer Bills*; Or *Greater*, and *Longer Tallons*? And whether Children may not have some *Wash*, or Something to make their *Teeth* Better, and Stronger? *Corall* is in use as an Help to the *Teeth* of Children.

Experiments in Consort, touching the *Generation* and *Bearing* of *living Creatures* in the *Wombe*.

SOme *Living Creatures Generate* but at certaine *Seasons* of the Yeare; As *Deer*, *Sheep*, *Wild-Coneys*, &c. And most Sorts of *Birds*, and *Fishes*: Others at any time of the *Yeare*, as *Men*; And all *Domesticke Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The *cause* of *Generation* at all Seasons seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the Creature, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all Seasons, are full of *Heat* and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The Tame *Dove* almost continually. But *Deer* are a *Melancholy dry Creature*, as appeareth by their *Fearfulnesse*, and the Hardnesse of their *Flesh*. *Sheep* are a *Cold* Creature, as appeareth by their *Mildnesse*, and for that they seldom *drink*. Most sort of *Birds* are of a *drie* Substance in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, Fulness of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldom, being *Tame*, generate often; Which is, from *Warmth*, and *Fulness* of *Food*. We finde, that the Time of *Going* to *Rut* of Deere is in *September*; For that they need the whole *Summers* Feed and Grasse, to make them fit for *Generation*. And if Rain come Earely about the Middle of *September*, they goe to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheep*, in respect of their small heat, generate about the same time, or somewhat before. But for the most part, Creatures that generate at certaine *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the Winter, and the *Heat* and *Comfort* of the Spring prepareth them. There is also another Reason, why some *Creatures* generate at certain Seasons: And that is the *Relation* of their Time of *Bearing*, to the time of Generation: For no Creature goeth to generat, whilest the *Female* is full; Nor whilest she is busie in *Sitting*, or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Eggs* or *Young* Ones, out of the *Nests* of *Birds*, they will fall to generate againe, three or four times, one after another. 758

Of *Living* Creatures; some are longer time in the *Womb*, and some *Shorter*. *Women* goe commonly nine Moneths; The *Cow* and the *Ewe* about sixe Moneths; *Does* goe about nine Moneths; *Mares* eleven Moneths: *Bitches* nine Weekes; *Elephants* are said to goe two Yeares; For the Received *Tradition* of ten Yeares is *Fabulous*. For *Birds* there is double Enquiry; The *distance* between the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe, between the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds* there is lesse *Diversity* of *Time*, than amongst other *Creatures*, yet some there is: For the *Hen* sitteth but three Weekes; The *Turky Hen*, *Goose*, and *Ducke*, a Moneth: *Quere* of others. The *Cause* of the great *difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *kind*; 759

Or from the *Constitution* of the *Womb*. For the former, those that are longer in comming to their *Maturity* or *Growth*, are longer in the *Womb*; As is chiefly seen in *Men*. And so *Elephants* which are long in the *Womb*, are long time in comming to their full *Growth*. But in most other Kinds, the *Constitution* of the *womb*, (that is, the *Hardnesse*, or *Drinesse* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure years of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three Quarters of a yeare, are but nine Weekes in the *Womb*. As for *Birds*, as there is lesse Diversitie, amongst them in the time of their *Bringing forth*; So there is lesse Diversitie in the time of their *Growth*; Most of them comming to their *Growth* within a Twelve-Moneth.

760 Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Birches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but One; As *Women*, *Lionesses*, &c. This may be caused, either by the *Quantity* of *Sperme* required to the *Producing* One of that Kinde; which if lesse be required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *Womb*, which may sever the *Sperme*.

Experiments in Consort, touching *species visible*.

761 THere is no doubt, but Light by *Refraction* will shew greater, as well as *Things coloured*. For like as a *Shilling*, in the *Bottome* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorn*, in the *Bottome* of the *Water*. I have heard of a Practice, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* Diveth, having his *Eyes* open, and swimmeth upon his *Back*, whether (I say) he seeth *Things* in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *finer*, how it worketh I know not.

762 It would be well boulted out, whether great *Refractions* may not be made upon *Reflections*, as well as upon *Direct Beames*. For Example, Wee see, that take an *Empty Bason*, put an *Angel* of *Gold*, or what you will, into it; Then go so farre from the *Bason*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Bason* with *Water*, and you shall see it out of his Place, because of the *Reflection*. To proceed therefore, put a *Looking-Glasse* into a Bason of *Water*; I suppose you shal not see the *Image* in a *right Line*, or at equall *Angles*, but aside. I know not whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*, Which for *beautie*, and *Strangenesse*, were a fine proof: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cisterne* or *Poole* of *Water*, you shal place over against it a picture of the *Devill*, or what you will so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can set the *Devills* Picture aside, not seeing the *water*, it will look like a *Devill* indeed. They have an old tale in *Oxford*, that *Friar Bacon* walked between two *Steeples*; Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

Experiments in Consort, touching, *Impulsion*, and *Percussion*.

763 A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth discusse the *Torpour* of *Solide Bodies*; Which beside their *Motion* of *Gravity*, have in them a *Natural Apetite*, not to move at all. And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* upon which it resteth, a stronger

Compression of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weighty Body* be Penſile, and hang but by a *Thred*, the *Percuſſion* will make an *Impulſion* very near as eaſily, as if it were already in *Motion*.

A *Body Over-great*, or *Over-ſmall*, will not be thrown ſo farre as a *Body* of a *Middle Size*: So that (it ſeemeth) there muſt be a *Commenſuration*, or *proportion*, betweene the *Body Moved*, and the *Force*, to make it move well. The *Cauſe* is, becauſe to the *Impulſion*, there is requiſite the *Force* of the *Body* that *Moveth*, and the *Reſiſtance* of the *Body* that is *Moved*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too ſmall*, it reſiſteth too little. 764

It is *Common Experience*, that no *Weight* will preſſe or cut ſo ſtrong, being laid upon a *Body*, as falling, or ſtrucken from above. It may be the *Aire* hath ſome part in furthering the *Percuſſion*: But the chiefe *Cauſe* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulſion*, or by the *Motion* of *Gravity continued*, a *Compreſſion* in them, as well downwards, as they have when they are throwne, or Shot thorow the *Aire* forwards. I conceive alſo, that the quick looſe of that *Motion*, preventeth the *Reſiſtance* of the *Body* below; And *Priority* of the *Force*, (always,) is of great *Efficacy*; As appeareth in infinite *Inſtances*. 765

Experiment Solitary touching *Titillation*. 766

Tickling is moſt in the *Soles* of the *Feet*, and under the *Arme-Holes*, and on the *Sides*. The *Cauſe* is, the *Thinneſſe* of the *Skin* in thoſe *Parts*, Joyned with the Rareneſſe of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinneſſe* of the *Skin*, and *Suddenneſſe*, and *Rareneſſe* of *Touch*, doe further: For we ſee, a *Feather*, or a *Ruſh*, drawn along the *Lip* or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuſe*, or a *Touch* more *Hard*, doth not. And for *Suddenneſſe*; Wee ſee no *Man* can Tickle himſelfe. We ſee alſo that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not *Tickliſh*, becauſe it is accuſtomed to be Touched. *Tickling* alſo cauſeth *Laughter*. The Cauſe may be, the *Emiſſion* of the *Spirits*, and ſo of the *Breath*, by a *Flight* from *Titillation*; For upon *Tickling*, we ſee there is ever a *Starting*, or *Shrinking*, away of the Part, to avoid it; And we ſee alſo, that if you *Tickle* the *Noſtrills* with a *Feather*, or *Straw*, it procureth *Sneezing*. Which is a Sudden *Emiſſion* of the *Spirits*, that doe likewiſe expell the *Moiſture*. And Tickling is ever Painfull, and not well endured.

Experiment Solitary, touching the *Scarcity* of *Raine* in *Egypt*. 767

IT is ſtrange, that the *River* of *Nilus*, Overflowing, as it doth, the *Countrey* of *Egypt*, there ſhould be nevertheleſſe little or no *Raine* in that *Countrey*. The Cauſe muſt be, either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be aſcribed, either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not ſo much as *Standing Waters*: Or elſe to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not ſo much, as *Waters Raw*; No more than *waters* upon the Fire doe vapour ſo much, after ſome time of Boyling, as at the firſt. And it is true, that the *Water* of *Nilus* is ſweeter than other *Waters* in Taſte; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which ſheweth it is *Lenifying*: And it runneth thorow a *Country* of a *Hot climate*, and flat, without Shade, either of *Woods* or *Hills*; Whereby the *Sunne* muſt needs have great Power to *concoct* it. As for the *Aire*, (from whence I conceive this want of Showers commeth chiefly;) The *Cauſe*

must be, for that the *Aire* is, of it ſelfe, *Thin* and *Thirſty*; And as ſoone as ever it getteth any Moiſture from the *Water*, it imbibeth, and diſſipateth it, in the whole body of the *Aire*; And ſuffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment Solitary, touching *Clarification*. 768

IT hath been touched in the *Title* of *Percolations*, (Namely ſuch as are *Inwards*,) that the *whites* of *Eggs*, and *Milk*, do clarifie; And it is certain that in *Ægypt*, they prepare and clarifie the water of *Nile*, by putting it into great *Jars* of *Stone*, and Stirring it about with a few Stamped *Almonds*; Wherewith they alſo beſmeare the Mouth of the *Veſſell*; And ſo draw it off, after it hath reſted ſome time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beer*, or *Muſt*, to haſten, and perfect the *Clarifying*.

Experiment Solitary, touching *Plants* without *leaves*. 769

THere be ſcarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*, except you allow *Corall* for one. But there is alſo in the *Deſarts* of *S. Macario* in *Ægypt*, a *Plant* which is Long, Leaveleſſe, Brown of Colour, and Branched like *Corall*, ſave that it cloſeth at the *Top*. This being ſet in *water* within *Houſe*, ſpreadeth, and diſplayeth ſtrangely; And the People thereabout have a Superſtitious Beleef, that in the *Labour* of *Women*, it helpeth to the *eaſie Deliverance*

Experiment Solitary, touching the *Materials* of *Glaſſe*: 770

THe *Chryſtalline Venice Glaſſe*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pavia*, by the River *Ticinum*, and the *aſhes* of a *weed*, called by the *Arabs Kall*, which is gathered in a *Deſart* between *Alexandria*, and *Roſetta*; And is by the *Ægyptians* uſed firſt for Fuell; And then they cruſh the *Aſhes* into lumps, like a Stone; And ſo ſell them to the *Venetians* for their *Glaſſe-works*.

Experiment Solitary, touching *Probibition* of *Putrefaction*, and the *long Conſervation* of *Bodies*. 771

IT is ſtrange, and well to be noted, how long *Carkaſſes* have continued *Uncorrupt*, and in their former *Dimenſions*; As appeareth in the *Mummies* of *Ægypt*; Having laſted, as is conceived, (ſome of them,) three thouſand yeares. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrails*, which are the *Parts* apteſt to corrupt. But that is nothing to the VVonder: For we ſee, what a Soft and corruptible *Subſtance* the *Fleſh*, of all the other *Parts* of the *Body*, is. But it ſhould ſeeme, that according to our *Obſervation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which we conceive to be ſo *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that Haſte to *Corruption*, that is conceived. And therefore *Bodies* in *Shining Amber*, In *Quick-Silver*, In *Balmes*, (whereof we now ſpeake,) In *Wax* In *Honey*, In *Gummes*, And (it may be) in *Conſervatories* of *Snow*, &c. are preſerved very long. It need not goe for Repetition, if wee reſume againe that which wee ſaid in the aforeſaid *Experiment*, concerning *Annihilation*; Namely, that if you provide againſt three Cauſes of *Putrefaction*, *Bodies* will not corrupt: The Firſt is, that the *Aire* be *Excluded*; For that undermineth the *Body*, and conſpireth with the *Spirit* of the *Bodie* to diſſolve it. The Second is, that the *Body Adjacent* and *Ambient*, be not Commateriall, but meerly Heterogeneall towards the Body that is to be preſerved: For if nothing can be received by the One, Nothing can iſſue from the other; Such are *Quick ſilver*, and *white Amber*, to *Herbs*, and *Flies*, and ſuch *Bodies*. The Third is, that the *Body* to be preſerved, be not of that *Groſſe*, that it may corrupt within it ſelfe, although no Part of it iſſue into the *Body adjacent*: And therefore it muſt be rather *Thin*,

and

and *Small*, than of *Bulk*. There is a fourth Remedy also, which is; That if the *Body* to be preserved be of *Bulk*, as a *Corps* is, then the Body that encloseth it, must have a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*. For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; VVhereof the one contained the *Body* of King *Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be seen, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *books*, they were found as fresh, as if they had been but newly Written; being written in *Parchment*, and covered over with *watch-candles* of Wax, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Ægyptians* were; Which was the cause that the Body was utterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Cæsar* visited the *Sepulchre* of *Alexander* the *Great*, in *Alexandria*, he found the *body* to keep his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *body* was so Tender, as *Cæsar* touching but the *Nose* of it, defaced it. Which maketh me finde it very strange, that the *Ægyptian Mummies* should be reported to be as hard as *Stone-pitch*: For I finde no difference but one; VVhich indeed may be very Materiall; Namely, that the Ancient *Ægyptian Mummies*, were shrowded in a Number of Folds of Linnen, besmeared with *Gums*, in manner of *Seare-cloth*; VVhich it doth not appeare was practised upon the *Body* of *Alexander*.

Experiment Solitary, touching the *Abundance* of *Nitre* in certaine *Sea-Shoares*.

772

NEare the Castle of *Catie*, and by the VVells of *Ajan*, in the Land of *Idumea*, a great Part of the VVay, you would think the Sea were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, upon the *Sea-Sands*; Such abundance of *Nitre* the *Shores* there doe put forth.

Experiment Solitary, touching *Bodies* that are *borne up by Water*.

773

THe *Dead Sea*, which vomiteth up *Bitumen*, is of that *Crassitude*, as Living Bodies bound Hand and foot, cast into it, have been borne up, and not sunke. VVhich sheweth, that all sinking into VVater, is but an *Overweight* of the Bodie, put into the VVater, in respect of the Water; So that you may make Water to strong, and heavy, of *Quick-Silver*, (perhaps) or the like, as may beare up *Iron*: Of which I see no Use, but Imposture. We see also, that all *Metalls* except *Gold*, for the same reason swimme upon *Quicke-Silver*.

Experiment Solitary, touching *Fuell* that *consumeth little*, or *nothing*.

774

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *blacke-Stone* (whereof *Pilgrims* make Fires,) which burneth like a *coale*, and diminisheth not; But only waxeth Brighter and Whiter. That it should doe so, is not strange: For we see *Iron* Red Hot burneth, and consumeth not; But the Strangenesse is, that it should continue any time so: For *Iron*, as soone as it is out of the Fire, deadeth straightwayes. Certainly, it were a Thing of great Use, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders Wooll*: Being a kind of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it is

is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*, (which *Spirit* or *Vapour* hath no *Weight*;) such as is the matter of *Ignis Fatuus*? But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oyle*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Vvicke* not burne.

Experiment Solitary *Oeconomicall* touching *Cheape Fuell*. 775

Sea-Coale last longer than *Char-coale*; And *Char-coale* of *Roots*, being Coaled into great Peeces, last longer than Ordinary *Char-coale*. *Turfe* and *Peat*, and *Cow-Sheards*, are cheape *Fuells*, and last long. *Small-coale*, or *Char-coale*, powred upon *Char-coale*, make them last longer. *Sedge* is a cheap *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-coale-Men* use it, privily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be used purposely, and bee made knowne, it is Saving.

Experiment Solitary, touching the *Gathering* of *Winde* for *Freshnesse*. 776

IT is, at this Day, in use, in *Gaza*, to couch *Pot-sheards* or *Vessels* of *Earth*, in their *VValls*, to gather the *VVind* from the Top, and to passe it downe in Spouts into *Roomes*. It is a Device for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italy*, and *Spaine*, for *Freshnesse*, and *gathering* the *VVinds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *VVinds*, and *Enlarging* them againe, and making them *Reverberate*, and goe *Round* in *circles*, rather than this *Device* of *Spouts* in the *VVall*.

Experiment Solitary, touching the *Tinctures of Aire*. 777

THere would be used much diligence, in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discover the *VVholesomenesse*, or *Vnwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discovery*; For they serve for a *Naturall Divination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

Experiment Solitary, touching *Increasing* of *Milke* in *Milch Beasts*. 778

THere is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *VVater*, whereof *Cattle* drinke; Which maketh them give more *Milke*. Surely, there would be some better Trialls made of *Mixtures* of *VVater* in *Ponds* for *Cattle*, to make them more *Milch*; Or to *Fatten* them; Or to *Keep* them from *Murrains*. I may bee, *Chalke*, and *Nitre*, are of the best.

Experiment Solitary, touching *Sand* of the Nature of *Glasse*. 779

IT is reported, that in the *Valley*, neare the *Mountaine Carmel*, in *Judea*, there is a *Sand*, which, of all other, hath most Affinitie with *Glasse*. Insomuch as other *Minerals*, laid in it, turne to a *Glassie Substance*, without the *Fire*; And againe *Glasse* put into it, turneth into the *Mother-Sand*. The Thing is very strange, if it be true: And it is likeliest to be Caused by some *Naturall Furnace*, of *Heat* in the *Earth*: And yet they doe not speak of any *Eruption* of *Flames*. It were good to trie in *Glasse-works*, whether the *Crude Materialls* of *Glasse*, mingled with *Glasse*, already made and Re-moulten, doe not facilitate the *Making* of *Glasse* with lesse *heat*.

In

IN the *Sea*, upon the *South-West* of *Sicily*, which *Coral* is found. It is a *Sub-Marine Plant*. It hath no *Leaves*: It brancheth onely, when it is under *Water*; It is *Soft*, and *Green* of *Colour*; But being brought into the *Aire*, it becommeth *Hard* and *Shining* Red, as wee see. It is said also, to have a *White Berry*; But we finde it not brought over with the *Coral*. Belike it is cast away as nothing worth. Inquire better of it, for the *Discovery* of the *Nature* of the *Plant*.

Experiment Solitary touching the *Growth*, of *Coral*. 780

THe *Manna* of *Calabria* is the best, and in most Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberry Trees*, as grow in the *Valleys*. And *Manna* falleth upon the *Leaves* by *Night*, as other *Dewes* doe. It should seem, that before those *Dewes* come upon *Trees* in the *Valleys*, they dissipate and cannot hold out. It should seeme also, the *Mulberry-Leaf*, it selfe hath some Coagulating Vertue, which inspissateth the *Dew*, for that it is not found upon other *Trees*. And we see by the *Silke-Worm*, which feedeth upon that Leafe, what a dainty Smooth *Iuyce* it hath; and the Leaves also, (especially of the Black *Mulberry*,) are somewhat Bristly, which may help to preserve the *Dew*. Certainly, it were not amisse, to observe a little better, the *Dewes* that fall upon *Trees*, or *Herbs*, Growing on *Mountains*: For it may be, many *Dewes* fall, that spend before they come to the *Valleys*. And I suppose, that he that would gather the best *Man-Dew* for *Medicine*, should gather it from the *hills*.

Experiment Solitary, touching the *Gathering* of *Manna*. 781

IT is said, they have a manner, to prepare their *Greeke-Wines*, to keepe them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome*: Whereof the one is *Unctuous*, and the other is *Astringent*. And certaine it is, that those two *Natures* doe represse the *Fumes*. This *Experiment* would be transferred unto other *Wine* and *Strong Beer*, by Putting in some like *Substances*, while they work; Which may make them both *to Fume* lesse, and to *Inflame* lesse.

Experiment Solitary, touching the *Correcting of Wine*. 782

IT is conceived by some, (not improbably,) that the reason, why *Wilde-Fires* (Whereof the principall Ingredient is *Bitumen*;) doe not quench with *Water*, is, for that the first *Concretion* of *Bitumen*, is a *Mixture*, of a *Fiery*, and *Watry Substance*: So is not *Sulphur*. This appeareth, for that in the Place near *Puteoli*, which they call the *Court* of *Vulcan*, you shall heare under the *Earth* a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Aetna*, and *Vesavius*, and the like, which consist upon *Sulphur*, shoot forth *Smoak*, and *Ashes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put under *Water*, will make, as it were, an *artificiall Rocke*. The *Substance* becommeth so Hard.

Experiment Solitary touching the *Materialls* of *Wilde-Fire*. 783

THere is a *Cement*, compounded of *Flower*, *Whites* of *Eggs*, and *Stone powdred*, that becommeth Hard as *Marble*; wherewith *Piscina Mirabilis*, neer *Cuma*, is said to have the Walls Plastered. And it is certaine, and tried, that the *Powder* of *Loadstone*, and *Flint*, by the Addition of *whites* of *Eggs*, and *Gumm-Dragan*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

Experiment Solitary, touching *Plaister* growing as *hard* as *Marble*. 784

It

Experiment Solitary touching *judgment of the Cure* in ſome *Vlcers* and *Hurts*. 785

IT hath beene noted by the *Ancients*, that in *Full*, or *Impure Bodies*; *Vlcers* or *Hurts* in the *Legges*, are Hard to Cure; And in the *Head* more eaſie. The *Cauſe* is, for that *Vlcers* or *Hurts* in the *Legges* require *Defluxion*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwiſe *Drineſs* maketh them more apt to Conſolidate. And in Moderne Obſervation, the like difference hath been found, between *French-men*, and *Engliſh-men*; whereof the ones *Conſtitution* is more *Dry*, and the others more *Moyſt*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-man*, and of the Legge in an *Engliſh-Man*.

Experiment Solitary, touching the *Healthfulneſſe* or *Vnhealthfulneſſe* of the *Southern wind* 786

IT hath been noted by the *Ancients*, that *Southern Winds*, blowing much, without *Rain*, doe cauſe a *Feverous Diſpoſition* of the *Ayre*; But with *Rain*, not. The Cauſe is, for that *Southern Winds* doe, of themſelves, qualifie the *Aire*, to be apt to cauſe *Fevers*; But when *Showers* are joyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southern Wind*. Therefore this holdeth not in the Sea-Coaſts, becauſe the *vapour* of the Sea, without *Showers*, doth refreſh.

Experiment Solitary, touching *Wounds*. 787

IT hath been noted by the *Ancients*, that *Wounds* which are made with *braſſe*, heale more eaſily, than *Wounds* made with *Iron*. The *Cauſe* is, for that *Braſs* hath, in it ſelfe, a *Sanative vertue*; And ſo in the very Inſtant helpeth ſomewhat: But *Iron* is *Corroſive*, and not *Sanative*. And therefore it were good, that the Inſtruments which are uſed by Chirurgions about *wounds*, were rather of *Braſſe*, than *Iron*.

Experiment Solitary, touching *Mortification by Cold*. 788

IN the Cold *Countries*, when Mens Noſes and *Eares* are Mortified, and (as it were) Gangrened with Cold, if they come to a Fire, they rot off preſently. The *cauſe* is, for that the few *ſpirits*, that remaine in thoſe Parts, are ſuddenly drawn forth, and ſo *Putrefaction* is made Compleat. But *Snow* put upon them helpeth; For that it preſerveth thoſe *Spirits* that remain, till they can revive; And beſides, *Snow* hath in it a ſecret *warmth*: As the *Monk* proved out of the Text, *Qui dat Nivem ſicut Lanam, Gelu ſicut Cineres ſpargit*. VVhereby he did inferre, that *Snow* did warme like *Wooll*, and *Froſt* did fret like *Aſhes*. *Warme water* alſo doth good; Becauſe by little and little it openeth the Pores, without any ſudden VVorking upon the *Spirits*. This *Experiment*, may bee transferred unto the *Cure* of *Gangrenes*, either comming of themſelves, or induced by too much applying of *Opiates*; VVherein you muſt beware of *Drie heat*, and reſort to things that are *Refrigerant*, with an Inward *warmth* and *Vertue* of Cheriſhing.

Experiment Solitary, touching *Weight*. 789

WEigh *Iron*, and *Aqua-Fortis*, ſeverally; Then diſſolve the *Iron* in the *Aqua-Fortis*: And weigh the *Diſſolution*; And you ſhall finde it to beare as good *weight*, as the Bodies did ſeverally: Notwithſtanding a good deale of VVaſt, by a thick *vapour*, that iſſueth during the *working*: VVhich ſheweth that the *Opening* of a *Body*, doth increaſe the *weight*. This was tried once or twice, but I know not whether there were any Errour, in the *Triall*.

Experiment Solitary, touching the *Super-Natation* of *Bodies*. 790

TAke of *Aqua-Fortis* two *Ounces*, of *Quick-ſilver* two *Drachmes*, (For that Charge the *Aqua-Fortis* will bear;) The *Diſſolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the increaſing of the weight of *wa-*

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ter will increase his *Power* of *Bearing*; as we see *Broine*, when it is Salt enough, will beare an *Egge*. And I remember well a *Physitian*, that used to give some Mineral *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary Water. But it seemeth, the *weight* of the *Quick-silver*, more than the *Weight* of a *Stone*; doth not compense the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment Solitary, touching the *Flying of Vnequall Bodies* in the *Aire*.

791

LEt there be a Body of *Vnequall weight*; (As of *Wood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Lighter End* forward, it will turne, and the *Weightier End* will recover to be forwards; Unlesse the *Body* be Over-long. The *Cause* is, for that the more *Dense Body*, hath a more Violent Pressure of the Parts, from the first *Impulsion*; Which is the *Cause* (though heretofore not found out, as hath beene often said,) of all *Violent Motions*: And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure* of *Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turn over: For (turned) it can more easily draw forward the *Lighter* Part. *Galileus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driven faster then the *Water* can follow, the *Water* gathereth upon an heape, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runneth the *Water*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone* or *Iron*, and another of *Wood*, of the same *Magnitude*, and *Shape*, and throw them with equall Force; you cannot possibly throw the *Wood*, so farre, as the *Stone*, or *Iron*.

Experiment Solitary, touching *Water*, that it may be the *Medium* of *Sounds*.

792

IT is certain, (as it hath been formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the Bottome of the *Water*, it maketh a *Sound*. So a long *Pole* struck upon *Gravell*, in the Bottom of the *Water*, maketh a *Sound*. Nay, if you should think that the *Sound* cometh up by the *Pole*, and not by the *Water*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no Solide *Body*, whereby the *Sound* can ascend.

Experiment Solitary of the *Flight* of the *Spirits* upon *Odious objects*

793

ALL *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horrour*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the Body Shiver. For *Tastes*, we see, that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Neck*, shake. For *Odious Smells* the like Effect followeth, which is lesse perceived, because there is a Remedy at hand, by Stopping of the *Nose*: But in *Horses*, that can use no such Help, we see the smell of a *Carrion*, especially of a *Dead horse*, maketh them fly away, and take on, almost as if they were Mad. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilness*, or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious object*, Comming into *Sudden Darkenesse*, induceth an Offer to *Shiver*.

Experiment Solitary, touching the *Super-Reflexion* of *Eccho's*.

794

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath Windowes onely from above. It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neare Fifty; Having a Dore in the Middest. It re-porteth

porteth the Voice, twelve or thirteene times, if you ſtand by the Cloſe *End-wall*, over againſt the *Door*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-Charenton* doth. And the Voice ſoundeth, as if it came from above the *Door*. And if you ſtand at the *Lower End*, or on either *Side* of the *Door*, the *Eccho* holdeth; But if you ſtand in the *Door*, or in the *Middeſt* juſt over againſt the *Door*, not. Note that all *Eccho's* ſound better againſt *old walls*, than *New*; Becauſe they are more *Dry* and *hollow*.

Experiment Solitary, touching the *Force* of *Imagination*, *Imitating* that of the *Senſe*. 795

THoſe Effects, which are wrought by the *Percuſſion* of the *Senſe*, and by *Things* in *Fact*, are produced likewiſe in ſome degree, by the *Imagination*. Therefore if a Man ſee another eate *Sour* or *Acide Things*, which ſet the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that ſeeth the *Thing* done by another, hath his own *Teeth* alſo ſet on edge. So if a Man ſee another turn ſwiftly, and long; Or if he look upon *wheels* that turne, Himſelfe waxeth *Turne-ſick*. So if a Man be upon an *High Place*, without *Rails*, or good Hold, except he be uſed to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, themſelves are ready to faint, as if they *Bled*, or were in *Striſe*.

Experiment Solitary, touching *Preſervation* of *Bodies*. 796

TAke a *Stock-Gilly-Flower*, and tie it gently upon a Sticke, and put them both into a *Stoope Glaſſe*, full of *Quickſilver*, ſo that the *Flower* be covered: Then lay a little *Weight* upon the Top of the *Glaſſe*, that may keepe the Sticke downe; And looke upon them after foure or five dayes; And you ſhall finde the *Flower* Freſh, and the *Stalk* Harder, and leſſe *Flexible*, than it was. If you compare it with another *Flower*, gathered at the ſame time, it will be the more manifeſt. This ſheweth that *Bodies* doe preſerve excellently in *Quick-ſilver*; and not preſerve only, but, by the *Coldneſs* of the *Quickſilver* *indurate*; For the *Freſhneſs* of the *Flower* may be meerly *Conſervation*; (which is the more to be obſerved, becauſe the *Quick-ſilver* preſſeth the *Flower*;) But, the *Stiffeneſſe* of the *Stalke*, cannot be without *Induration*, from the Cold (as it ſeemeth,) of the *Quick-ſilver*.

Experiment Solitary touching the *Growth*, or *Multiplying* of *Metalls*. 797

IT is reported by ſome of the *Ancients*, that in *Cyprus*, there is a *Kind* of *Iron*, that being cut into *Little Peeces*, and put into the Ground, if it be well *watered*, will increaſe into *Greater Peeces*. This is certaine, and known of Old; That *Lead* will multiply, and Increaſe; As hath been ſeen in *Old Statue's* of *Stone*, which have been put in *Cellars*; The *Feet* of them being bound with *Leaden bands*; Where (after a time) there appeared, that the *Lead* did ſwell; Inſomuch as it hanged upon the *ſtone* like *Warts*.

Experiment Solitary, touching the *Drowning* of the more *Baſe Metall* in the more *Precious*. 798

I Call *drowning* of *Metals*, when that the *Baſer Metall*, is ſo incorporat with the more *Rich*, as it can by no Meanes be ſeparated againe: which is a kinde of *Verſion*, though Falſe: As if *Silver* ſhould be in inſeparably incorporated with *Gold*: Or *Copper*, and *Lead*, with Silver. The Ancient *Electrum* had in it a fifth of *Silver* to the *Gold*; And made a *Compound Metall*, as fit, for moſt uſes, as *Gold*; and more Reſplendent, and more Qualified in ſome other Properties. But then that was eaſily Separated. This to doe privily, or to make the *Compound* paſſe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it bee done avowedly, and without Diſguizing, it may be a great *Saving* of the *Richer Metall*. I remember to have heard of a Man, skilfull in *Metalls*, that a Fifteenth Part of *Silver*, incorporate with *Gold*,

Gold, will not be Recovered by any *Water* of *Separation*; Except you put a Greater *Quantity* of *Silver*, to draw to it the Leſſe; which (hee ſaid) is the laſt Refuge in *Separations*. But that is a tedious way, which no Man (almoſt) will thinke on. This would be better enquired; And the *Quantity* of the Fifteenth turned to a Twentieth; And likewiſe with ſome little *Additionall*, that may further the *Intrinſique Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimenſion*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take ſo much the more *Silver*, as will countervaile the *Over-weight* of the *Lead*.

Experiment Solitary, touching *Fixation of Bodies*. 799

Gold is the onely *Subſtance*, which hath nothing in it *Volatile*, and yet melteth without much difficultie. The *Melting* ſheweth that it is not Jejune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Cloſe Coacervation* of them: Whereby they have the leſſe Appetite, and no Meanes (at all) to iſſue forth. It were good therefore to try, whether *Glaſs Re-moulten* do leeſe any *Weight*? For the *Parts* in *Glaſſe* are evenly Spred; But they are not ſo Cloſe as in *Gold*; As we ſee by the Eaſie Admiſſion of *Light*, *Heat*, and *Cold*; And by the *Smalneſſe* of the *Weight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As wee ſee in the *Stuffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Cauſes* of *Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Cloſeneſſe* of the *Tangible Parts*; And the *Jejuneneſſe* or *Extreme Comminution* of *Spirits*: of which Three, the two Firſt may be joyned with a *Nature Liqueſiable*; The Laſt not.

Experiment Solitary, touching the *Reſtleſſe Nature* of Things in *Themſelves* and their *Deſire* to *change*. 800

IT is a Profound *Contemplation* in *Nature*, to conſider of the *Emptineſſe*, (as we may call it,) or *Unſatisfaction* of leverall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is moſt manifeſt, that it doth it with a kinde of *Thirſt*, as not ſatisfied with his own former Conſiſtence; For elſe it would never receive them in ſo ſuddenly, and eaſily. *Water*, and all *Liquours*, doe haſtily receive *Drie* and more *Terreſtriall Bodies*, Proportionable: And *Drie Bodies*, on the other ſide, drinke in *Waters*, and *Liquours*: So that, (as it was well ſaid, by one of the *Ancients*, of *Earthy* and *Watry Subſtances*,) *One is a Glue to another*, *Parchment*, *Skins*, *Cloth*, &c. drink in *Liquours*, though themſelves be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Aſhes*; Not apparently Porous: *Metalls* themſelves doe receive in readily *Strong-waters*; And *Strong-waters* likewiſe doe readily pierce into *Metalls*, and *Stones*: And that *Strong-water* will touch upon *Gold*, that will not touch upon *Silver*; And *è Converſo*. And *Gold*, which ſeemeth by the *Weight*, to be the Cloſeſt, and moſt Solide *Body*, doth greedily drink in *Quick-Silver*. And it ſeemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Conſent. Of the *Cauſe* of this, and to what *Axiome* it may be referred, conſider attentively; For as for the Pretty Aſſertion, that *Matter* is like a *Common Strumpet*, that deſireth all *Formes*, it is but a *Wandring Notion*. Onely *Flame* doth not content it ſelfe to take in any other *Body*; But either to overcome and turne another *Body* into it Selfe, as by Victory; Or it Selfe to dye, and goe out.

NATVRALL HISTORIE.

IX. Century.

IT is certaine, that all *Bodyes* whatſoever, though they have no *ſenſe*, yet they have *Perception*: For when one *Body* is applyed to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* be *Alterant*, or *Altered*, evermore a *Perception* preceedeth *Operation*: For elſe all *Bodyes* would be alike One to Another. And ſometimes this *Perception*, in ſome Kinde of *Bodyes*, is farre more Subtill than the *ſenſe*; So that the *ſenſe* is but a dull thing in Compariſon of it: We ſee a *Weather-Glaſſe*, will finde the leaſt difference of the *Weather*, in *Heat*, or *Cold*, when men finde it not. And this *Perception* alſo, is ſometimes at *Diſtance*, as well as upon the *Touch*; as when the *Load-ſtone* draweth *Iron*; or *Flame* fireth *Naptha* of *Babylon*, a great diſtance of. It is therefore a Subject of a very *Noble Enquiry*, to enquire of the more *ſubtill Perceptions*; For it is another *Key* to open *nature* as well as the *ſenſe*; and ſometimes better. And beſides, it is a Principall *Meanes* of *naturall Divination*; For that which in theſe *Perceptions* appeareth early, in the great *effects* commeth long after. It is true alſo, that it ſerveth to *diſcover* that which is *Hid*, as well as to *foretell* that which is to *Come*;

Experiments in Conſort, touching *Perception* in *Bodies Inſenſible*, tending to *Naturall Divination*, or, *Subtill Trials*.

Come; As it is in many *Subtill Trialls*; As to trie whether *Seeds* be old, or new, the *ſenſe* cannot informe: But if you boile them, in *Water*, the new ſeeds will ſprout ſooner: And ſo of *Water*, the *Taſte* will not diſcover the beſt *Water*; but the *ſpeedy conſuming* of it, and many other *Meanes*, which wee have heretofore ſet downe, will diſcover it. So in all *Phyſiognomy*, the *Lineaments* of the *Body* will diſcover thoſe *Naturall inclinations* of the *Minde*, which *diſſimulation* will conceale, or Diſcipline will ſuppreſſe. We ſhall therefore now handly onely, thoſe two *Perceptions*, which pertaine to *Naturall divination*, and *Diſcovery*: Leaving the Handling of *Perception* in other things, to be diſpoſed elſewhere. Now it is true, that *divination* is attained by other *Meanes*; As if you know the *Cauſes*; If you know the *Concomitants*: you may judge of the Effect to follow: And the like may be ſaid of Diſcovery; But we tie our Selves here, to that Divination and diſcovery chiefly, which is cauſed by an Early, or *ſubtill Perception*.

The *Aptneſſe* or *Propenſion* of *Aire*, or *Water*, to Corrupt or Putrifie, (noe doubt,) is to be found before it breake forth into manifeſt *Effects* of *Diſeaſes*, *Blaſting*, or the like. We will therefore ſet downe ſome *Prognoſticks* of *Peſtilentiall* and *Vn-wholeſome Yeares*.

801 The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*, have been ſpoken of before. Alſo the *Plenty* of *Frogs*, *Graſſhoppers*, *Flies*, and the like *creatures* bred of *Putrefaction*, doth portend *Peſtilentiall Yeares*.

802 *Great*, and *Early Heats* in the *Spring*, (and namely in *May*,) without *Winds*, portend the ſame, And generally ſo doe *Yeares* with little *Wind*, or *Thunder*.

803 *Great Droughts* in *Summer*, laſting till towards the *End* of *Auguſt*, and ſome *Gentle Showers* upon them; And then ſome *Drie Weather* again; Doe portend a *Peſtilent Summer*, the *Yeare* following: for about the *End* of *Auguſt*, all the *Sweetneſſe* of the *Earth*, which goeth into *Plants* or *Trees*, is exhaled; (And much more if the *Auguſt* be drie;) So that nothing then can breathe forth of the *Earth*, but a groſſe *Vapour*, which is apt to Corrupt the *Aire*: And that *vapour*, by the firſt *Showres*, if they be *Gentle*, is releaſed, and commeth forth abundantly. Therefore they that come abroad ſoon after thoſe *ſhowers*, are commonly taken with *ſickneſſe*. And in *Africke*, no Body will ſtirre out of doores after the firſt *Showers*. But if the firſt *Showres* come vehemently, then they rather waſh and fill the *Earth*, than give it leave to breathe forth preſently. But if *Dry Weather* come againe, then it fixeth and continueth the *corruption* of the *Aire*, upon the firſt *Showers* begun; And maketh it of ill *Influence*, even to the Next *Summer*; Except a very *Frutive Winter* diſcharge it; Which ſeldome ſucceeth ſuch *Droughts*.

804 The *Leſſer Infections*, of the *ſmall Pocks*, *Purple Feavers*, *Agues*, in the *Sum-*

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mer *Precedent*, and hovering all *winter*, do portend a great *Peſtilence* in the *Summer* following; For *Putrefaction* doth not riſe to his height at once.

805 It were good to lay a *Peece* of *Raw Fleſh*, or *Fiſh*, in the *Open Aire*; And if it Putrefie quickly, it is a *Signe* of a *Diſpoſition* in the *Aire* to *Putrefaction*. And becauſe you cannot be informed, whether the *Putrefaction* be quick or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amiſſe in the ſame *Yeare*, and at the ſame *Time*, to lay one *Peece* of *Fleſh*, or *Fiſh*, in the *Open ayre*, and another of the ſame Kinde and Bigneſſe, within *Doores*: For I judge, that if a general *Diſpoſition* be in the *Air* to Putrefie, the *Fleſh*, or *Fiſh*, will ſooner Putrefie abroad, where the *Aire* hath more power, than in the *Houſe*, where it hath leſſe, being many wayes corrected. And this *Experiment* would be made about the *End* of *March*: For that *Seaſon* is likeſt to diſcover, what the *VVinter* hath done; And what the *Summer* following will doe upon the *Aire*. And becauſe the *Aire* (no doubt) receiveth great *Tincture*, and *Infuſion* from the *Earth*; It were good to try that *Expoſing* of *Fleſh*, or *Fiſh*, both upon a *Stake* of *VVood*, ſome height above the *Earth*, and upon the *Flat* of the *Earth*.

806 Take *May-Dew*, and ſee whether it putrefie quickly, or no? For that likewiſe may diſcloſe the *Quality* of the *Aire*, and *Vapor* of the *Earth*, more or leſſe *Corrupted*.

807 A *Dry March*, and a *Dry May*, portend a *Wholeſome Summer*, if there bee a *Showring April* betweene: But otherwiſe, it is a *Signe* of a *Peſtilentiall Yeare*.

808 As the *Diſcovery* of the *Diſpoſition* of the *Aire*, is good for the *Prognoſticks* of *VVholeſome*, and *Unwholeſome Yeares*; So it is of much more uſe, for the *Choice* of *Places* to dwell in: At the leaſt, for *Lodges*, and *Retiring Places* for *Health*; (For *Maanſion Houſes* reſpect *Proviſions*, as well as *Health*;) Wherein the *Experiments* above mentioned may ſerve.

809 But for the *Choice* of *Places*, or *Seats*, it is good to make Tryall, not onely of *aptneſſe* of *Aire* to corrupt, but alſo of the *Moiſture* and *Drineſſe* of the *Aire*; and the *Temper* of it, in *Heat* or *Cold*; For that may concerne *Health* diverſly. We ſee that there be ſome *Houſes*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainſcots* will alſo ſweat more, ſo that they will almoſt run with *water*: All which, (no doubt) are cauſed chiefly by the *Moiſtneſſe* of the *Aire*, in thoſe *Seats*. But becauſe it is better to know it, before a *Man* buildeth his *Houſe*, than to finde it after, take the *Experiments* following.

810 Lay *VVooll*, or a *Sponge*, or *Bread*, in the *Place* you would try, comparing it with ſome other *Places*; and ſee whether it doth not moiſten, and make the *VVooll*, or *Sponge*, &c. more Ponderous, than the other? And if it doe, you may judge of that Place, as Situate in a *Groſſe* and *Moiſt Ayre*.

811 Becauſe it is certain, that in ſome *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more Unequall, than in Others; And *Inequality* of *Aire* is ever an Enemy to *Health*; It were good to take two *Weather-Glaſſes*, Matches in all things, and to ſet them, for the ſame Houres of One day, in ſeveral *places*, where no *Shade* is, nor *Incloſures*: And to mark when you ſet them, how farre the *Water* commeth; And to compare them, when you come againe, how the *Water* ſtandeth then: And if you finde them *Unequall*, you may be ſure that the *Place* where the *Water* is loweſt, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequality* be, of the *Aſcent*, or *Deſcent* of the *Water*, the greater is the *Inequality* of the *Temper* of the *Aire*.

812 The *Predictions* likewiſe of *Cold* and *Long Winters*, and *Hot* and *Drie Summers*, are good to be knowne; As well for the *Diſcovery* of the *Cauſes*, as for divers *Proviſions*. That of *Plenty* of *Hawes* and *Heps*, and *Briar-Berries*, hath been ſpoken of before. If *Wainſcoat*, or *Stone*, that have uſed to Sweat, be more dry in the Beginning of *Winter*; Or the *Drops* of the *Eaves* of *Houſes* come more ſlowly downe, than they uſe; it portendeth a *Hard* and *Froſtie Winter*. The *Cauſe* is, for that it ſheweth an *Inclination* of the *Aire*, to *Drie weather*; which in *Winter* is ever joyned with *Froſt*.

813 Generally, a *Moiſt* and a *Coole Summer*, portendeth a *Hard Winter*. The *Cauſe* is, for that the *Vapours* of the *Earth*, are not diſſipated in the *Summer*, by the *Sunne*; And ſo they rebound upon the *Winter*.

814 A *Hot* and *Dry Summer*, and *Autumne*, and eſpecially if the *Heat* and *Drought* extend far into *September*, portendeth an Open Beginning of *Winter*, and *Colds* to ſucceed, toward the latter Part of the *Winter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the Sway; and the *Vapours* are not ſufficiently Multiplied.

815 An *Open* and *Warme Winter* portendeth a *Hot* and *Dry Summer*: For the *Vapours* diſperſe into the *Winter Showers*; Whereas *Cold* and *Froſt* keepeth them in, and tranſporteth them into the late *Spring*, and *Summer* following.

816 *Birds* that uſe to change *Countries*, at certaine *Seaſons*, if they come Earlier, doe ſhew the *Temperature* of *Weather*, according to that *Countrey* whence they came: As the *Winter-Birds*, (namely, *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with us ſhew *Cold Winters*. And if it be in the ſame *Countrey*, then they ſhew a *Temperature* of *Seaſon*, like unto that *Seaſon* in which they come: As *Swallowes*, *Batts*, *Cuckoes*, &c. that come towards *Summer*, if they come earely, ſhew a *Hot Summer* to follow.

817 The *Prognoſticks*, more Immediate, of *Weather* to follow ſoone after, are more Certaine than thoſe of *Seaſons*. The *Reſounding* of the *Sea* upon the *Shoare*; And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind*; ſhew *Wind* to follow: For ſuch *Winds*, breathing chiefly out of the *Earth*, are not at the firſt perceived, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Caves* likewiſe portendeth as much.

818 The *Upper Regions* of the *Aire*, perceive the *Collection* of the *Matter* of *Tempeſt*, and *Winds*, before the *Aire* here below: And therefore the *Obſcuring* of the *Smaller Starres* is a *Signe* of *Tempeſts* following. And of this kind you ſhall finde a Number of *Inſtances* in our *Inquiſition de Ventis*.

819 *Great Mountaines* have a *Perception* of the *Diſpoſition* of the *Aire* to *Tempeſts*, ſooner than the *Valleys* or *Plaines* below: And therefore they ſay in *Wales*, when certaine *Hills* have their *Night-Caps* on, they mean Miſchiefe. The *Cauſe* is, for that *Tempeſts*, which are for the moſt part bred above, in the *Middle Region*, (as they call it,) are ſooneſt perceived to collect in the *Places* next it.

820 The *Aire*, and *Fire*, have *Subtill Perceptions* of *Wind Riſing*, before *Men* finde it. We ſee the *Trembling* of a *Candle* will diſcover a *Wind*, that otherwiſe we doe not feele: And the *Flexuous Burning* of *Flames* doth ſhew the *Aire* beginneth to be unquiet: And ſo doe *Coales* of *Fire* by caſting off the *Aſhes* more then they uſe. The *cauſe* is, for that no *Wind*, at the firſt, till it hath ſtrook and driven the *Aire*, is apparent to the *Senſe*: But *Flame* is eaſier to move, than *Aire*: And for the *Aſhes*, it is no marvell, though *Wind* unperceived ſhake them off; For wee uſually try, which way the *Wind* bloweth,

bloweth, by caſting up *Graſſe*, or *Chaffe*, or ſuch light things into the *Aire*.

When *Wind* expireth from under the *Sea*; as it cauſeth ſome *Reſoundings* of the *Water*, (whereof we ſpake before,) ſo it cauſeth ſome *Light Motions* of *Bubbles*, and *white Circles* of *Froth*. The *Cauſe* is, for that the *Wind* cannot be perceived by the *Senſe*, untill there be an *Eruption* of a great *Quantity*, trō under the *Water*; And ſo it getteth into a *Body*: Whereas in the firſt *Putting up* it commeth in little Portions. 821

We ſpake of the *Aſhes*, that *Coales* caſt off; And of *Graſſe*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moveth, when we find no *Wind*, ſheweth a *VVind* at hand: As when *Feathers*, or *Down* of *Thiſtles*, fly to and fro in the *Aire*. 822

For *Prognoſticks* of *Weather* from *Living Creatures*, it is to be noted; That *Creatures* that live in the *Open Aire*, (*Sub Dio*) muſt needs have a Quicker *Impreſsion* from the *Aire*, than *Men* that live moſt within *Doores*; And eſpecially *Birds* who live in the *Aire*, freeſt, and cleareſt; and are apteſt by their *Voyce* to tell Tales, what they finde; and likewiſe by the *Motion* of their *Flight* to expreſſe the ſame.

Water-Fowles, (as *Sea-Gulls*, *More-Hens*, &c.) when they flock and fly together, from the *Sea* towards the *Shores*; And contrariwiſe, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *waters* with their *Wings*; doe fore-ſhew *Raine*, and *Wind*. The *Cauſe* is, *Pleaſure*, that both Kindes take in the *Moiſtneſſe*, and *Denſity* of the *Aire*: And ſo deſire to be in *Motion*, and upon the *VVing*, whitherſoever they would otherwiſe goe: For it is no Marvell that *VVater-Fowle* doe joy moſt in that *Aire*, which is likeſt *VVater*; And *Land-Birds*, alſo, (many of them) delight in *Bathing*, and *Moiſt ayre*. For the ſame Reaſon alſo, many *Birds* doe proine their *Feathers*; And *Geeſe* doe gaggle; And *Crowes* ſeem to call upon *Raine*: All which is but the Comfort they ſeem to receive in the *Releating* of the *Aire*. 823

The *Heron*, when ſhe ſoareth high, (ſo as ſometimes ſhe is ſeen to paſſe over a *Cloud*,) ſheweth *VVinds*: But *Kites* flying aloft, ſhew *Faire* and *Dry weather*. The *Cauſe* may be, for that they both mount moſt into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleaſure in the *Aire*, that is Condenſed: And beſides, being but Heavy of *Wing*, needeth the Help of the *Greſſer Aire*. But the *Kite* affecteth not ſo much the *Groſſeneſſe* of the *Aire*, as the *Cold* and *Freſhneſſe* thereof; For being a *Bird* of *Prey*, and therefore *Hot*, ſhe delighteth in the *Freſh Aire*; And (many times) flyeth againſt the *Wind*; As *Trouts*, and *Salmons* ſwim againſt the Streame. And yet it is true alſo, that all *Birds* finde an Eaſe in the depth of the *Aire*; As *Swimmers* doe in a Deep *Water*. And therefore when they are aloft, they can uphold themſelves with their *Wings Spread*, ſcarce moving them. 824

Fiſhes, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cauſe* is, for that a *Fiſh* hating the *Drie*, will not approach the *Aire*, till it groweth *Moiſt*; And when it is *Dry*, will flye it, and *Swim* lower. 825

Beaſts doe take Comfort, (generally,) in a *Moiſt Aire*; And it maketh them eat their *Meat* better: And therefore *Sheep* will get up betimes in the 826

the Morning, to feed, againſt *Raine*: And *Cattell*, and *Deere*, and *Conies*, will feed hard before *Raine*: And a *Heifer*, will put up his *Noſe*, and ſnuffe in the *Ayre*, againſt *Raine*.

827 The *Trifoile*, againſt *Raine*, ſwelleth in the *Stalk*; and ſo ſtandeth more upright; For by *Wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Countrey People call the *VVincopipe*; which if it open in the *Morning*, you may be ſure of a fair *Day* to follow.

828 Even in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieve, either towards *Raine*, or towards *Froſt*: For the One maketh the *Humours* more to *Abound*, and the Other maketh them Sharper. So we ſee both *Extremes* bring the *Gout*.

829 *Wormes*, *Vermine*, &c. doe fore-ſhew (likewiſe) *Rain*: For *Earth-wormes* will come forth, and *Moules* will caſt up more, and *Fleas* bite more, againſt *Raine*.

830 *Solide Bodies* likewiſe fore-ſhew *Raine*. As *Stones*, and *Wainſcot*, when they *Sweat*: And *Boxes*, and *Pegges* of *Wood*, when they Draw, and *Winna hard*; Though the Former be but from an Outward Cauſe; For that the *Stone*, or *Wainſcot*, turneth and beateth back the *Aire* againſt it ſelfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it ſelfe.

Experiment Solitary, touching the *Nature* of *Appetite* in the *Stomach*.

831 *Appetite* is moved chiefly by Things that are *Cold*, and *Dry*; The *Cauſe* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth upon Supply; And ſo is *Drineſſe*: And therefore all *Soure Things*, (as *Vinegar*, *Juyce* of *Limons*, *Oyle* of *Vitriol*, &c.) provoke *Appetite*. And the *Diſeaſe* which they call *Appetitus Caninus*, conſiſteth in the *Matter* of an *Acide* and *Glaſſy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is alſo moved by *Soure Things*; For that *Soure Things* induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; which is a great *Cauſe* of *Appetite*. As for the *Cauſe* why *Onyons*, and *Salt*, and *Pepper*, in Baked Meats, move *Appetite*, it is by *Vellication* of thoſe *Nerves*; For *Motion* whetteth. As for *Wormewood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitterneſſe*, they move *Appetite* by *Abſterſion*. So as there be foure Principall *Cauſes* of *Appetite*, The *Refrigeration* of the *Stomach* joyned with ſome *Drineſſe*; *Contraction*; *Vellication*; And *Abſterſion*: Beſides *Hunger*, which is an *Emptineſſe*: And yet *Over-faſting* doth (many times) cauſe the *Appetite* to ceaſe; For that *want* of *Meat* maketh the *Stomach* draw *Humours*; And ſuch *Humours* as are Light, and Cholerick, which quench *Appetite* moſt.

Experiment Solitary, touching *Sweetneſſe* of *Odour* from the *Rain-bow*.

832 IT hath beene obſerved by the *Ancients*, that where a *Raine-Bow* ſeemeth to hang over, or to touch, there breatheth forth a *Sweet Smell*. The *Cauſe* is, for that this happeneth but in certain Matters, which have in themſelves ſome *Sweetneſſe*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they alſo make the *Ground* Sweet: But none are ſo delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be alſo, that the *water* it ſelfe hath ſome *Sweetneſſe*: For the *Raine-Bow* conſiſteth of a *Glomeration* of *Small Drops*, which cannot poſſible fall, but from the *Aire*, that is very *Low*: And therefore may hold the very *Sweetneſſe* of the *Herbs*, and *Flowers*, as a *Diſtilled water*: For *Raine*, and other *Dew*, that fall from high, cannot preſerve the Smell, being diſſipated in the drawing up: neither doe we know, whether ſome *VVater* it ſelfe may not have ſome degree of *Sweetneſſe*. It is true, that wee finde it ſenſibly in no *Poole*, *River*, nor

nor *Fountain*; but good *Earth*, newly turned up, hath a *freshness* and good *scent*; which *Water*, if it be not too equall, (for equall *objects* never move the *Sense*) may also have. Certaine it is, that *Bay-Salt*, which is but a kind of *Water congealed*, will sometimes smell like *Violets*.

Experiment Solitary touching *Sweet Smells*. 833

TO *Sweet Smels heat* is requisite, to Concoct the *Matter*; and some *Moisture* to Spread the *Breath* of them. For *heat*, we see that *Woods*, and *Spices*, are more *Odorate* in the *hot Countries*, than in the *cold*: for *Moisture*, we see that things too much dried, lose their *Sweetnesse*: and *Flowers* growing, smell better in a Morning or Evening, then at Noone. Some *Sweet Smels* are destroyed by approach to the *Fire*; as *Violets*, *Wall-flowers*, *Gilli-flowers*, *Pinks*; and generally all *Flowers* that have *coole* and *delicate Spirits*. Some continue both on the *fire*, and from the *fire*; as *Rose-Water*, &c. Some do scarce come forth, or at least not so pleasantly, as by means of the *fire*; as *Iuniper*, *Sweet-Gums*, &c. And all *Smells*, that are *enclosed* in a *Fast Body*: but (Generally) those *Smels* are the most gratefull, where the *Degree* of *heat* is small; or where the strength of the *Smell* is allayed; for these things do rather woo the *Sense*, then satiate it. And therefore the *smell* of *Violets*, and *Roses* exceedeth in *sweetnesse* that of *spices*, and *Gummes* and the strongest sort of *smells*, are best in a west, a farre off.

Experiment Solitary touching the *Corporall substance* of *Smels* 834

IT is certaine, that no *smell* issueth, but with *Emission* of some *Corporeall Substance*, Not as it is in *Light*, and *Colours*, and in *Sounds*, For we see plainly, that *Smell* doth spread nothing that distance, that the other doe. It is true, that some *Woods* of *Orenges*, and *Heaths* of *Rose-mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, since a Peale of *Ordnance* will doe as much, which moveth in a small Compasse? Whereas those *Woods* and *Heaths*, are of Vast Spaces: Besides, we see that *Smells* doe adhere to *Hard Bodyes*; As in perfuming of *Gloves*, &c. which sheweth them *Corporall*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment Solitary, touching *Fetide* and *Fragrant Odours*. 835

THE *Excrements* of most *Creatures* smell ill; Chiefly to the same *Creature* that voideth them: For we see, besides that of *Man*, that *Pigeons*, and *Horses* thrive best, if their *Houses*, and *Stables* be kept Sweet; And so of *Cage-Birds*: And the *Cat* burieth that which she voideth: And it holdeth chiefly in those *Beasts*, which feed upon *Flesh*. *Dogs* (almost) onely of *Beasts* delight in *Fetide Odours*, Which sheweth there is somewhat in their *Sense* of *Smell*, differing from the *smells* of other *Beasts*. But the *Cause*, why *Excrements* smell ill, is manifest; For that the *Body* it selfe rejecteth them, Much more the *Spirits*: And we see, that those *Excrements* that are of the *First Digestion*, Smell the worst; As the *Excrements*, from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Vrine*, and those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrefactions* are of an *Odious Smell*. For they smell either *Fetide*, or *Mouldy*. The *Cause* may bee, for that *Putrefaction* doth bring forth such a *Consistence*, as is most Contrary to the Consistence of the *Body*, whilest it is Sound: For it is a meere dissolution of it at *Forme*. Besides, there is another Reason which is Profound: And it is, that the *objects* that please any of the *senses*, have (all) some *Equality*, and (as it were) *Order* in their *Composition*: But where those are wanting, the Object is ever Ingrate. So *Mixture* of many *Disagreeing colours*

is never unpleaſant to the *Eye*: Mixture of *Diſcordant ſounds* is unpleaſant to the *Eare*: Mixture, or *botch-potch* of many *taſtes*, is unpleaſant to the *Taſt*: Harſhneſſe and Ruggednesſe of Bodies, is unpleaſant to the *Touch*: Now it is certaine that all *Putrefaction*, being a *Diſſolution* of the firſt *Forme*, is a meere *Confuſion*, and *Vnformed* Mixture of the Part. Nevertheleſſe, it is ſtrange, and ſeemeth to croſſe the former Obſervation, that ſome *Putrefactions* and *Excrements* do yeeld excellent *Odours*; as *Civit* and *Muske*; and as ſome thinke *Amber-Greece*: For divers take it, (though unprobably,) to come from the *Sperme* of *Fiſh*: and the *Moſſe* we ſpake off from *Apple-Trees*, is little better then an *Excretion*. The Reaſon may be, for that there paſſeth in the *Excrements*, and remaineth in the *Putrefactions*, ſome good Spirits; eſpecially where they proceed from *Creatures*, that are very *Hot*. But it may be alſo joyned with a further Cauſe, which is more ſubtill; and it is, that the *Senſes* love not to be Over-pleaſed; But to have a Commixture of ſomewhat that is in it ſelfe Ingrate. Certainly, we ſee how *Diſcords* in *Muſicke*, falling upon *Concords*, make the *Sweeteſt Strains*: and we ſee againe, what ſtrange *taſtes* delight the *Taſt*; as *Red-Herrings*, *Caviary*, *Parmizan*, &c. And it may be, the ſame holdeth in *Smells*. For thoſe kind of *Smells*, that we have mentioned, are all ſtrong, and do Pull and Vellicate the *Senſe*. And we find alſo, that places where Men *Vrine*, commonly have ſome Smell of *Violets*: And *Vrine*, if one hath eaten *Nutmeg*, hath ſo too.

The Slothfull, Generall, and Indifinite *Contemplations*, and *Notions*, of the *Elements*, and their *Conjugations*; Of the *Influences* of *Heaven*; Of *Hot*, *Cold*, *Moyſture*, *Drought*, *Qualities Active*, *Paſſive*; and the like; have ſwallowed up the true *Paſſages*, and *Proceſſes*, and *Affects*, and *Conſiſtences* of *Matter*, and *Naturall Bodies*. Therefore they are to be ſet aſide, being but *Notionall*, and *ill Limited*; and *Definite Axiomes* are to be drawn out of meaſured *Inſtances*: and ſo aſſent to be made to the more *Generall Axioms*, by *Scale*. And of theſe Kinds of *Proceſſes* of *Natures*, and *Characters* of *Matter*, we will now ſet downe ſome *Inſtances*.

Experiment Solitary, touching the *Cauſes of Putrefaction*.

836

ALL *Putrefactions* come chiefly from the inward Spirits of the Body, and partly alſo from the *Ambient Body*, be it *Aire*, *Liquour*, or whatſoever elſe. And this laſt, by no *Means*: Either by *Ingreſſe* of the *Subſtance* of the *Ambient Bodie*, into the *Body Putrified*; Or by *Excitation* and *Solicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Received Opinion, that *Putrefaction* is cauſed, either by *Cold*, or *Peregrin* and *Preternaturall heat*, it is but Nugation: For *Cold* in things *Inanimate*, is the greateſt enemy that is to *Putrefaction*; though it extinguiſheth *Vivification*, which ever conſiſteth in Spirits *Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine head*, it is thus farre true; That if the Proportion of the *Adventine heat*, be greatly predominant, to the *Naturall heat*, and Spirits of the Body, it tendeth to *diſſolution*, or notable *alteration*. But this is wrought by *Emiſſion*, or *Suppreſſion*, or *Suffocation*, of the Native *Spirits*, and alſo by the *Diſordination*, and *Diſcompoſture* of the *Tangible Parts*; and other *Paſſages* of *Nature*; and not by a *Conflict* of heats.

In

IN *Verſions*, or *Main Alterations* of *Bodyes*, there is a *Medium* between the *Body*, as it is at firſt, and the *Body* reſulting; which *Medium* is *Corpus imperfectè Miſtum*, and is Tranſitory, and not durable; As *Miſts*, *Smokes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the firſt *Vivification*: And the *Middle Action*, which produceth ſuch *Imperfect Bodies*, is fitly called, (by ſome of the *Ancients*,) *Inquination*, or *Inconcoction*, which is a Kinde of *Putrefaction*; For the *Parts* are in *Confuſion*, till they ſettle, one way, or other.

Experiment Solitary, touching *Bodies unperfectly Mixt*. 837.

THe word *Concoction*, or *Digeſtion*, is chiefly taken into uſe from *Living Creatures*, and their *Organs*; And from thence extended to *Liquours*, and *Fruits*, *&c.* Therefore they ſpeak of *Meat Concocted*; *Urine* and *Excrements Concocted*; And the *Foure Digeſtions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Severall Parts* of the *Body*;) are likewiſe called *Concoctions*: And they are all made to be the Workes of *Heat*. All which *Notions* are but ignorant Catches of a few things, which are moſt obvious to *Mens Obſervations*. The Conſtanteſt *Notion* of *Concoction* is, that it ſhould ſignifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to *Perfect Concoction*; which is the *Ultimity* of that *Action*, or *Proceſſe*: And while the *Body* to be *Converted* and *Altered*, is too ſtrong for the *Efficient*, that ſhould *Convert*, or *Alter* it, (whereby it reſiſteth and holdeth faſt in ſome degree the firſt *Forme*, or *Conſiſtence*,) it is (all that while,) *Crude*, and *Inconcoct*; And the *Proceſſe* is to be called *Crudity* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Work* of *Heat*: But not the *Work* of *Heat* alone: For all things, that further the *Converſion*, or *Alteration*, (as *Reſt*, *Mixture* of a *Body* already *Concocted*, &c.) are alſo *Means* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Aſſimilation*, or *Abſolute Converſion* and *Subaction*; The other *Maturation*: whereof the Former is moſt conſpicuous in the *Bodies* of *Living Creatures*; In which there is an *Abſolute Converſion* and *Aſſimilation* of the *Nouriſhment* into the *Body*: And likewiſe in the *Bodies* of *Plants*: And again in *Metalls*, where there is a full *Tranſmutation*. The other, (which is *Maturation*) is ſeen in *Liquours* and *Fruits*; wherein there is not deſired, nor pretended, an utter *Converſion*, but onely an *Alteration* to that *Form*, which is moſt ſought, for *Mans* uſe; As in *Clarifying* of *Drinks*, *Ripening* of *Fruits*, &c. But note, that there be two Kindes of *Abſolute Converſions*; The one is, when a *Body* is converted into another *Body* which was before; As when *Nouriſhment* is turned into *Fleſh*; That is it which we call *Aſſimilation*. The other is, when the *Converſion* is into a *Body* merely New, and which was not before; As if *Silver* ſhould be turned to *Gold*, or *Iron* to *Copper*: And this *Converſion* is better called, for diſtinction ſake, *Tranſmutation*.

Experiment Solitary, touching *Concoction* and *Crudity*. 838.

THere are alſo divers other *Great Alterations* of *Matter*, and *Bodies*, beſides thoſe that tend to *Concoction*, and *Maturation*; For whatſoever doth ſo alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Major*: As when *Meat* is Boyled, or Roſted, or Fried, &c. Or when *Bread* and *Meat* are Baked, Or when *Cheſe* is made of Curds, or *Butter* of Cream, or *Coles* of Wood, or *Bricks* of Earth; And a Number of others. But to apply *Notions Philoſophicall* to *Plebian Terms*; Or to ſay, where the *Notions* cannot fitly be reconciled, that there wanteth a *Term*, or *Nomenclature* for it; (as the *Ancients* uſed:) They be but Shifts of *Ignorance*: For

Experiment Solitary, touching *Alterations*, which may be called *Majors*. 839.

Knowledge

Knowledge will be ever a *Wandring* and *Indigeſted Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from ſufficient Number of Inſtances, and thoſe well collated.

The *Conſiſtencies* of *Bodies* are very Divers: *Denſe*, *Rare*, *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, Not *Determinate*, *Hard*, *Soft*; *Cleaving*, Not *Cleaving*; *Congelable*, Not *Congelable*; *Liqueſiable*, Not *Liqueſiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawne forth in length, *Intractile*; *Porous*, *Solide*; *Equall*, and *Smooth*, *Vnequall*; *Venous*, and *Fibrous*, and with *Graines*, *Entire*; And divers Others; All which to referre to *Heat*, and *Cold*; and *Moiſture*, and *Drought* is a Compendious and Inutile *Speculation*. But of theſe ſee principally our *Abecedarium Naturæ*; And otherwiſe *Sparſim* in this our *Sylva Sylvarum*: Nevertheleſſe in ſome good part, We ſhall handle divers of them now preſently.

Experiment Solitary, touching *Bodies Liqueſiable*, and not *Liqueſiable*.

840

Liqueſiable, and *Not Liqueſiable*, proceed from theſe *Cauſes*: *Liqueſaction* is ever cauſed by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore ſuch *Bodies*, as are more *Turgide* of *Spirit*; Or that have their *Spirits* more *Straitly Impriſoned*; Or again that hold them *Better Pleaſed* and *Content*; Are *Liqueſiable*: for theſe three *Diſpoſitions* of *Bodies*, doe arreſt the *Emiſſion* of the *Spirits*. An Example of the firſt two *Properties* is in *Metalls*; And of the laſt in *Greaſe*, *Pitch*, *Sulphur*, *Butter*, *Wax*, &c. The *Diſpoſition* not to *Liqueſie* proceedeth from the *Eaſie Emiſſion* of the *Spirits*, whereby the *Groſſer Parts* contract; And therefore, *Bodies Iejune* of *Spirits*; Or which part with their *Spirits* more *Willingly*, are not *Liqueſiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, even many of thoſe *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithſtanding *Soften*; As *Iron* in the Forge; And a *Stick* bathed in Hot Aſhes, which thereby becommeth more Flexible. Moreover, there are ſome *Bodies*, which do *Liqueſie*, or diſſolve by *Fire*; As *Metalls*, *Wax*, &c. And other *Bodies*, which diſſolve in *Water*; As *Salt*, *Sugar*, &c. The *Cauſe* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The *Cauſe* of the latter proceedeth from the *Opening* of the *Tangible Parts*, which deſire to receive the *Liquour*. Againe, there are ſome *Bodies*, that diſſolve with both; As *Gumme*, &c. And thoſe be ſuch *Bodies*, as on the one ſide have good ſtore of *Spirit*; And on the other ſide, have the *Tangible Parts Indigent* of *Moiſture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the latter ſtimulateth the Parts to receive the *Liquor*.

Experiment Solitary, touching *Bodies Fragile*, and *Tough*.

841

OF *Bodies* ſome are *Fragile*; And ſome are *Tough*, and *Not Fragile*; And in the *Breaking*, ſome *Fragile Bodies* break but where the Force is: Some ſhatter and flie in many Peces. Of *Fragility* the *Cauſe* is an *Impotency* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And ſo *Fictile Earth* is more *Fragile* than *Crude Earth*, and *Dry Wood* than *Green*. And the *Cauſe* of this *Vnaptneſſe* to *Extenſion*, is the *Small Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extenſion* or *Dilatation* of *Bodyes*;) And it is ever Concomitant with *Poroſity*, and with *Drineſſe* in the *Tangible Parts*:

Contrariwiſe,

Contrariwise, *Tough Bodies* have more *Spirits*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore we see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* scarcely.

ALL *Solide Bodies* consist of *Parts* of two severall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Native Spirit* of the *Bodie*; And in some other, plaine *Air* that is gotten in; As in *Bodies desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fragile*; For the *Native Spirit* is more *Yeelding*, and *Extensive*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great Diversity; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as we call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

Experiment Solitary, touching the *Two Kinds* of *Pneumaticals* in *Bodies*. 842

THE *Concretion* of *Bodies* is (commonly) solved by the *Contrary*, As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolved by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations* are rather *Returnes* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by Contrary *Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either Meanes, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it be Vehement,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them Swell, than Congeale them: As when *Ice* is congealed in a *Cup*, the *Ice* will Swell in stead of Contracting; And sometimes Rift.

Experiment Solitary touching *Concretion*, and *Dissolution* of *Bodies*. 843

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Jejuneneſſe* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which if they be in a greater degree, maketh them not onely *Hard*, but *Fragile*, and lesse Enduring of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which ever helpeth to Induce *Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as we use the word,) are of two *Kinds*; The one, that easily giveth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places*: And therefore we see that *Wax*, if you put any Thing into it, doth not rise in *Bulk*, but only giveth Place: For you may not think, that in *Printing* of *Wax*, the *Wax* riseth up at all; But only the *depressed Part* giveth place, and the other remaineth as it was. The other that altereth *Bulke* in the *Cession*, as *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they give place (indeed) easily, but then they rise all over: Which is a False *Cession*; For it is in *Place*, and not in *Body*,

Experiment Solitarie, touching *Hard* and *Soft Bodies*. 844

ALL *Bodies Ductile*, and *Tensile*, (as *Metals*) that will be drawne into *Wires*; *Wooll* and *Towe* that will be drawn into *Yarne*, or *Thred*; have in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not *Discontinue* or forsake

Experiment Solitary, touching *Bodies Ductile*, and *Tensile*. 845

forſake their owne *Body*. *Viſcous Bodies*, (likewiſe,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheeſe toaſted*, will draw forth, and roape. But the difference between *Bodies Fibrous*, and *Bodies Viſcous*, is Plaine; For all *Woll*, and *Tow*, and *Cotton*, and *Silke*, (eſpecially raw *Silke*,) have, beſides their deſire of *Continuance*, in regard of the *Tenuitie* of their *Thred*, a *Greedineſſe* of *Moiſture*; And by *Moiſture* to joyne and incorporate with other *Thred*; Eſpecially, if there be a little *Wreathing*; As appeareth by the *Twiſting* of *Thred*; And the Practice of *Twirling* about of *Spindles*. And we ſee alſo, that *Gold* and *Silver Thred* cannot be made without *Twiſting*.

Experiment Solitary touching other *Paſſions* of *Matter*, and *Characters* of *Bodies*.

846

THe *Differences* of *Impreſſible*, and *Not Impreſſible*, *Figurable*, and *Not Figurable*; *Mouldable*, and *Not Mouldable*; *Sciſſible*, and *Not Sciſſible*; and many other *Paſſions* of *Matter*, are *Plebeian Notions*, applied unto the *Inſtruments* and *Uſes* which Men ordinarily practiſe; But they are all but the *Effects* of ſome of theſe *Cauſes* following; Which we will Enumerate without Applying them, becauſe that would be too long. The Firſt is the *Ceſſion*, or *Not Ceſſion* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the Outward *Bulke*, and not flying up. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuitie*, and to flie *Diſcontinuitie*. The Third is the *Diſpoſition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantity*, or *Great Quantity*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it be *Native Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Native Spirits* in the *Body*, whether they be *Active*, and *Eager*, or *Dull* and *Gentle*. The Seventh is the *Emiſſion* or *Detenſion* of the *Spirits* in *Bodies*. The Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Unequall*; And againe, whether the *Spirits* be *Coacervate*, or *Diffuſed*. The Tenth is the *Denſitie*, or *Rarity* of the *Tangible Parts*. The Eleventh is the *Equality*, or *Inequality* of the *Tangible Parts*. The Twelfth is the *Diſgeſtion*, or *Crudity* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous*, or *Mercuriall*, *Watry*, or *Oylie*, *Drie*, and *Terreſtriall*, or *Moiſt*, and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, ſeeme to be *Natures Radicall*, and *Principall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length* or *Tranſverſe*; (As it is in the *Warp*, and the *Woofe*, of *Textiles*;) *More Inward*, or *More Outward*, &c. The Fifteenth is the *Poroſity*, or *Imporoſity* betwixt the *Tangible Parts*; And the *Greatneſſe*, or *Smalneſſe* of the *Pores*. The Sixteenth is the *Collocation* and *Poſture* of the *Pores*. There may be more *Cauſes*; But theſe doe occure for the Preſent.

Experiment Solitary, touching *Induration* by *Sympathy*.

847

TAke *Lead*, and melt it, and in the Middeſt of it, when it beginneth to Congeale, make a little Dint, or Hole, and put *Quick-Silver* wrapped in a Peece of *Linnen* into that Hole, and the *Quick-Silver* will fix, and runne no more, and endure the Hammer. This is a Noble *Inſtance* of *Induration*, by *Conſent* of one *Body* with another, and *Motion* of *Excitation* to *Imitate*; For to aſcribe it onely to the *Vapour* of *Lead*, is leſſe Probable. *Quare* whether the *Fixing* may be in ſuch a degree, as it will be Figured like other *Metals*? For if ſo, you may make Workes of it for ſome purpoſes, ſo they come not neare the *Fire*.

Sugar

Experiment Solitary touching *Honey* and *Sugar*. 848

Sugar hath put downe the use of *Honey*; Insomuch as we have lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Bloud* issuing from the *Tree*: Insomuch as one of the *Ancients* relateth, that in *Tribesond*, there was *Honey* issuing from the *Box-Trees*, which made *Men* Mad. Againe, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not so Lushious as Ours. They had also a *Wine* of *Honey*, which they made thus. They crushed the *Honey* into a great *Quantity* of *Water*, and then strained the *Liquour*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Vessels*, for a small time; And after turned it into *Vessels* of *Wood*, and kept it for many yeares. They have also, at this day, in *Russia*, and those *Northerne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very Cleare. They use also in *Wales*, a Compound *Drink* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that we have lost in *Honey*, there were brought in use a *Sugar-Mead*, (for so we may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keep it stale, as they use *Mead*; For certainly, though it would not be so *Absterssive*, and *Opening*, and *Solutive* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitive*, and fit to be used in *Sharp Diseases*: For we see, that the use of *Sugar* in *Beer*, and *Ale*, hath good *Effects* in such Cases.

Experiment Solitary, touching the *Finer Sort* of *Base Metals*. 849

IT is reported by the *Ancients*, that there was a Kinde of *Steele*, in some places, which would polish almost as white and bright as *Silver*. And that there was in *India* a Kinde of *Brass*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; but I am doubtfull, whether Men have sufficiently refined *Metals*, which we count *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Height? But when they come to such a Fineness, as serveth the ordinary use, they trie no further.

Experiment Solitarie, touching *Cements* and *Quarries*. 850

THere have been found certain *Cements* under *Earth*, that are very Soft; And yet, taken forth into the *Sun*, harden as Hard as *Marble*: There are also ordinary *Quarries* in *Summerset-Shire*, which in the *Quarry* cut soft to any bigness, and in the *Building* prove firme, and hard.

Experiment Solitary, touching the *Altering* of the *Colour* of *Haires* and *Feathers*. 851

Living Creatures (generally) doe change their *Hair* with *Age*, turning to be *Gray*, and *White*: As is seene in *Men*, though some Earlier, some Later; In *Horses*, that are Dappled, and turn *White*; in *Old Squirrels*, that turn *Grisly*; And many Others. So doe some *Birds*; As *Cygnets*, from *Gray* turn *White*; *Hawkes* from *Brown* turn more *White*; And some *Birds* there be, that upon their *Moulting*, doe turn *Colour*; As *Robin-Red-brests*, after their *Moulting* grow to be *Red* again by degrees; So doe *Gold-Finches* upon the *Head*. The *Cause* is, for that *Moisture* doth (chiefly) colour *Hair*, and *Feathers*; And *Drineſs* turneth them *Gray* and *White*; Now *Hair* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Hair* of the *Head*, and doth (for the most part,) wax *Hoare* later. Out of this Ground, a *Man* may devise the *Means* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this see the fifth *Experiment*.

Experiment Solitary, touching the *Differences* of Living Creatures, *Male* and *Female*. 852

THe *Difference* between *Male* and *Female*, in ſome *Creatures*, is not to be diſcerned, otherwiſe than in the *Parts* of *Generation*: As in *Horſes* and *Mares*, *Dogs*, and *Bitches*, *Doves He* and *Shee*, and others. But ſome differ in *Magnitude*, and that diverſly; For in moſt the *Male* is the greater; As in *Man*, *Pheſants*, *Peacocks*, *Turkey's*; and the like: And in ſome few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantity*, *Criſpation*, and *Colours* of them; As *Hee-Lions*, are *Hirſute*, and have great *Maines*; The *She's* are ſmooth like *Cats*. *Buls* are more *Criſpe* upon the *Fore-Head* than *Cowes*; The *Peacock*, and *Pheſant-Cock*, and *Gold-Finch-Cock*, have glorious and fine *Colours*; The *Henn's* have not. Generally, the Hees in *Birds* have the faireſt *Feathers*. Some differ in divers *Features*; As *Bucks* have *Hornes*, *Doe's* none; *Rammes* have more *Wreathed Hornes* than *Ewes*; *Cocks* have great *Combes* and *Spurres*, *Hennes* little or none; *Boares* have great *Fangs*, *Sowes* much leſſe; The *Turky-Cocke* hath great and Swelling *Gils*, the *Henne* hath leſſe; *Men* have generally Deeper and Stronger *Voices* than *Women*. Some differ in *Faculty*; As the *Cocks* amongſt *Singing Birds*, are the beſt *Singers*. The Chiefe *Cauſe* of all theſe, (no doubt,) is, for that the *Males* have more Strength of *Heat* than the *Females*; Which appeareth manifeſtly in this, that all young *Creatures Males*, are like *Females*; And ſo are *Eunuchs*, and *Gelt Creatures* of all kindes, liker *Females*. Now *Heat* cauſeth *Greatneſſe* of *Growth*, generally, where there is *Moiſture* enough to worke upon: But if there be found in any *Creature*, (which is ſeene rarely,) an Over-great *Heat* in proportion to the *Moiſture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moiſture*, then there is no *Difference* to be ſeene between *Male* and *Female*: As in the *Inſtances* of *Horſes*, and *Dogs*. We ſee alſo, that the *Hornes* of *Oxen*, and *Cowes*, for the moſt part, are Larger than the *Buls*; which is cauſed by abundance of *Moiſture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* cauſeth *Piloſitie* and *Criſpation*; And ſo likewiſe *Beards* in *Men*. It alſo expelleth finer *Moiſture*, which want of *Heat* cannot Expell; And that is the *Cauſe* of the *Beauty* and *Variety* of *Feathers*: Againe, *Heat* doth put forth many *Excreſcences*, and much Solide *Matter*, which Want of *Heat* cannot doe: And this is the *Cauſe* of *Hornes*, and of the *Greatneſſe* of them; And of the *Greatneſſe* of the *Combs* and *Spurres* of *Cocks*, *Gils* of *Turkey-Cocks*, and *Fangs* of *Boares*. *Heat* alſo dilateth the *Pipes*, and *Organs*, which cauſeth the *Deepneſſe* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that cauſeth the *Cock-Singing Bird*, to Excell the *Hen*.

Experiment Solitary, touching the *Comparative Magnitude* of *Living Creatures*. 853

THere be *Fiſhes* greater then any *Beaſts*; As the *Whale* is farre greater than the *Elephant*. And *Beaſts* are (generally) greater than *Birds*. For *Fiſhes*, the *Cauſe* may be, that becauſe they Live not in the *Aire*, they have not their *Moiſture* drawne, and Soaked by the *Aire*, and *Sunne-Beames*. Alſo the reſt alwayes in a manner, and are ſupported by the *Water*; whereas *Motion* and *Labour* do conſume. As for the *Greatneſſe* of *Beaſts*, more than of *Birds*, it is cauſed, for that *Beaſts* ſtay Longer time in the *Womb*, than *Birds*, and there Nouriſh, and grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nouriſhment* from the *Female*: For the *Sitting* doth *Vivifie*, and not Nouriſh.

Experiment Solitary touching *Exoſſation* of *Fruits*. 854

WE have partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this we adde further, that the *Cauſe* muſt be *Abundance* of *Moiſture*; For that the *Coare*, and *Stone* are made of a *Drie*

Sap:

Sap: And we ſee, that it is poſſible, to make a *Tree* put forth onely in *Bloſſome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more in *Fruit* without *Stones*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted upon a *Colewort-Stalke*, ſendeth forth a great *Apple* without a *Coare*. It is not unlikely, that if the *Inward Pith* of a *Tree*, were taken out, ſo that the Juyce came onely by the *Barke*, it would worke the *Effect*. For it hath been obſerved, that in *Pollards*, if the *Water* get in on the *Top*, and they become Hollow, they put forth the more. We adde alſo, that it is delivered for certain by ſome, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* have little or no *Coares*, and *Stones*.

Experiment Solitary touching the *Melioration* of *Tobacco*. 855

Tobacco is a thing of great Price, if it be in requeſt. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwiſe, is great, but nothing to the Profit. But the *Engliſh Tobacco*, hath ſmall credit, as being too *Dull*, and *Earthy*: Nay, the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the ſame *Cauſe*: So that a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some have gone about to doe it by Drenching the *Engliſh Tobacco*, in a *Decoction*, or *Infuſion* of *Indian Tobacco*: But thoſe are but Sophiſtications, and Toyes; For Nothing that is once Perfect, and hath runne his Race, can receive much Amendment. You muſt ever reſort to the Beginnings of Things for *Melioriation*. The Way of *Maturation* of *Tobacco* muſt, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne*: We ſee ſome Leading of this in Musk-Melons; which are ſowen upon a *Hot Bed*, Dunged below, upon a Bank turned upon the *South Sun*, to give *Heat* by *Reflexion*; Laid upon *Tiles*, which increaſeth the *Heat*; And Covered with *Straw* to keepe them from *Cold*. They remove them alſo, which addeth ſome *Life*: And by theſe Helps they become as good in *England*, as in *Italy*, or *Provence*. Theſe, and the like Meanes, may be tried in *Tobacco*. Enquire alſo of the *Steeping* of *Roots*, in ſome ſuch *Liquour*, as may give them Vigour to put forth Strong.

Experiment Solitary touching ſeverall *Heate*, working the ſame *Effects*. 856

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea, and the *Heat* of *Vivification* of *Living Creatures*; are both repreſented and ſupplyed, by the *Heat* of *Fire*, And likewiſe, the *Heats* of the *Sunne*, and *Life*, are repreſented one by the other. *Trees*, ſet upon the *Backs* of *Chimneyes*, doe ripen *Fruit* ſooner. *Vines*, that have been drawn in at the Window of a *Kitchin*, have ſent forth *Grapes* ripe a Moneth (at leaſt) before others. *Stoves*, at the Backe of Wals, bring forth *Orenges* here with us. *Egges*, as is reported by ſome, have been hatched in the warmth of an *Oven*. It is reported by the *Ancients*, that the *Eſtrich* Layeth her *Egges* under *Sand*, where the *Heat* of the *Sunne* diſcloſeth them.

Experiment Solitarie, touching *Swelling* and *Dilatation* in *Boyling*. 857

Barley in the *Boyling* ſwelleth not much; *Wheat* ſwelleth more; *Rize* extreamly; In ſo much as a Quarter of a Pint (unboyled) will ariſe to a Pint boyled. The *Cauſe* (no doubt) is, for that the more Cloſe and Compact the *Body* is, the more it will dilate: Now *Barley* is the moſt Hollow; *Wheat* more Solide than that; and *Rize* moſt Solide of all. It may be alſo, that ſome *Bodies* have a Kinde of *Lentour*, and more *Depertible Nature* than others; As we ſee it Evident in *Colouration*, For a Small *Quantity* of *Saffron*, will Tinct more, than a very great *Quantity* of *Breſill*, or *Wine*.

Experiment Solitary touching the *Dulcoration* of *Fruits*. 858

Fruit groweth *Sweet* by *Rowling*, or *Preſsing* them gently with the *Hand*; As *Rowling Peares*, *Damaſins*, &c. By *Rottenneſſe*; As *Medlars*, *Services*, *Sloes*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomegranats*, &c. By certaine Speciall *Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roaſting*, *Stewing*, *Baking*, &c. The *Cauſe* of the *Sweetneſſe* by *Rowling*, and *Preſsing*, is *Emollition*, which they properly enduce; As in Beating of *Stock-Fiſh*, *Fleſh*, &c. By *Rottenneſſe* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby diſgeſt the Harder Part: For in all *Putrefactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, becauſe the *Spirits* of the *Body*, doe ever feed upon the *Tangible Parts*, and attenuate them. By Severall *Maturations* is, by ſome *Degree* of *Heat*. And by *Fire* is, becauſe it is the Proper Worke of *Heat* to Refine, and to Incorporate; And all *Soureneſſe* conſiſteth in ſome *Groſſeneſſe* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which ever induceth a Milder *Taſte*.

Experiment Solitary touching *Fleſh Edible*, and not *Edible*. 859

OF *Fleſhes*, ſome are *Edible*; Some, except it be in *Famine*, not. For thoſe that are not *Edible*, the *Cauſe* is, for that they have (commonly) too much *Bitterneſſe* of *Taſte*; And therefore thoſe *Creatures*, which are Fierce and Cholerick, are not *Edible*; As *Lions*, *Wolves*, *Squirrels*, *Dogs*, *Foxes*, *Horſes*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We ſee they are *Milde*, and *Fearfull*. Yet it is true, that *Horſes*, which are *Beaſts* of Courage, have beene, and are eaten by ſome *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chiniſes* eat *Horſe-fleſh* at this day; And ſome *Gluttons* have uſed to have *Colts-fleſh* baked. In *Birds*, ſuch as are *Carnivora*, and *Birds* of *Prey*, are commonly no Good *Meat*; But the Reaſon is, rather the *Cholerick Nature* of thoſe *Birds*, than their *Feeding* upon *Fleſh*; For *Puits*, *Guls*, *Shovelers*, *Ducks*, doe feed upon *Fleſh*, and yet are good *Meat*: And wee ſee, that thoſe *Birds*, which are of *Prey*, or feed upon *Fleſh*, are good *Meat*, when they are very Young; As *Hawkes*, *Rookes* out of the Neſt, *Owles*, &c. *Mans Fleſh* is not Eaten. The Reaſons are Three: Firſt, becauſe *Men* in *Humanity* doe abhorre it: Secondly, becauſe no *Living Creature*, that *Dyeth* of *it ſelfe*, is good to Eat: And therefore the *Canibals* (themſelves) eat no *Mans Fleſh*, of thoſe that *Die* of *Themſelves*, but of ſuch as are *Slaine*. The Third is, becauſe there muſt be (generally) ſome *Diſparity*, between the *Nouriſhment*, and the *Body Nouriſhed*; And they muſt not be Overneare, or like: yet we ſee, that in great *Weakneſſes*, and *Conſumptions*, *Men* have been ſuſtained with *Womans Milke*: And *Picinus* fondly, (as I conceive) adviſeth, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of ſome wholeſome *Young Man*; And the *Bloud* to be ſucked. It is ſaid, that *Witches* doe greedily eat *Mans Fleſh*; which if it be true, beſides a *Devilliſh Appetite* in them, it is likely to proceed, for that *Mans Fleſh* may ſend up High and Pleaſing *Vapours*, which may ſtirre the *Imagination*; And *Witches* Felicity is chiefly in *Imagination*, as hath beene ſaid.

Experiment Solitary touching the *Salamander*. 860

THere is an Ancient Received *Tradition* of the *Salamander*, that it liveth in the *Fire*, and hath force alſo to extinguiſh the *Fire*. It muſt have two Things, if it be true, to this *Operation*, The One, a very *Cloſe Skin*, whereby *Flame*, which in the Midſt is not ſo hot, cannot enter: For we ſee that if the *Palme* of the *Hand* be annointed thicke with *White* of *Eggs*, and then

then *Aquavitæ*, bee poured upon it, and *Enflamed*, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and *Quenching Vertue*, in the *Body* of that *Creature* which choaketh the *Fire*. We see that *Milke* quencheth *Wild-fire* better than *Water*, because it entreth better.

Experiment Solitary touching the *Contrary Operations* of *Time*, upon *Fruits* and *Liquors*. 861

Time doth change *Fruit*, (as *Apples*, *Pears*, *Pomgranats*, &c. from more *Soure* to more *Sweet*: But contrariwise, *Liquors* (even those that are of the *Juyce* of *Fruit*,) from more *Sweet* to more *Soure*, As *Wort*, *Must*, *New-Verjuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both Kinds, the *Spirit* is attenuated by *Time*; But in the first Kinde, it is more *Diffused*, and more mastered by the *Grosser Parts*, which the *Spirits* doe but digest: But in *Drinks* the *Spirits* doe reign, and finding lesse Opposition of the *Parts*, become themselves more *Strong*; Which causeth also more Strength in the *Liquor*; Such, as if the *Spirits* be of the Hotter Sort, the *Liquor* becommeth apt to *Burn*; But in Time, it causeth likewise, when the Higher *Spirits* are Evapourated, more *Sourenes*.

Experiment Solitarie, touching *Blows* and *Bruises*. 862

IT hath been observed by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keep it down from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath only a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters* and *Ointments* doe enter. Surely, the *Cause* that *Blows* and *Bruises* induce *Swellings* is, for that the *Spirits* resorting to Succour the *Part* that Laboureth, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment Solitary, touching the *Orris Root*. 863

THe *Nature* of the *Orris Root*, is almost Singular; For there be few *Odoriferous Roots*; And in those that are in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood* or *Leafe*: but the *Orris* is not *Sweet* in the *Leaf*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a Tender dainty *Heat*, which when it commeth above Ground, to the *Sun*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a Smell like a *Violet*.

Experiment Solitary, touching the *Compression* of *Liquors*. 864

IT hath been observed by the *Ancients*, that a great *Vessel* full, drawn into *Bottles*; And then the *Liquor* put again into the *Vessel*, will not fill the *Vessel* again, so full as it was, but that it may take in more *Liquor*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may bee Triviall; Namely, by the *Expence* of the *Liquor*, in regard some may stick to the Sides of the *Bottles*: But there may be a *Cause* more Subtill; Which is, that the *Liquor* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessel*, the *Liquor* meeteth with *Liquor* chiefly; But in the *Bottles* a Small Quantity of *Liquor*, meeteth with the Sides of the *Bottles*, which Compress it so, that it doth not Open again.

Experiment Solitary, touching the *Working* of *Water* upon *Air Contiguous*. 865

WAter, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it *Vapour*. The *Cause* is, for that *Heat* and *Cold* have a *Virtual Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such severall Levitie, and Gravity, as they Mingle not, they can follow no

no *Imbibition*. And therefore, *Oyle* likewiſe lyeth at the *Top* of the *Water*, without Commixture: And a *Drop* of *Water*, running ſwiftly over a *Straw*, or *Smooth Body*, wetteth not.

Experiment Solitary touching the *Nature* of *Aire*.

866 *Starre-Light Nights*, yea, and bright *Moone-ſhine Nights*, are *Colder* than *Cloudy Nights*. The *Cauſe* is, the *Drineſſe* and *Fineneſſe* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Iſlands*: And as for the *Moone*, though it ſelfe inclineth the *Aire* to *Moiſture*, yet when it ſhineth bright, it argueth the *Aire* is drie. Alſo *Cloſe Aire* is warmer than *Open Aire*; which (it may be) is, for that the true *Cauſe* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is ſtronger; And again, *Aire* it ſelfe, if it be not altered by that *Expiration*, is not without ſome Secret *Degree* of *Heat*: As it is not likewiſe without ſome Secret *Degree* of *Light*: For otherwiſe *Cats*, and *Owles*, could not ſee in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Viſuall Spirits* of thoſe *Creatures*.

Experiments in Conſort, touching the *Eyes*, and *Sight*.

867 THe *Eyes* doe move one and the ſame way; For when one *Eye* moveth to the *Noſthrill*, the other moveth from the *Noſthrill*. The *Cauſe* is *Motion* of *Conſent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Uſe* will induce the Contrary: For ſome can *Squint*, when they will: And the Common *Tradition* is, that if *Children*, be ſet upon a Table, with a Candle behinde them, both *Eyes* will move Outwards; As affecting to ſee the *Light*, and ſo induce *Squinting*.

868 We ſee more exquiſitely with *One Eye Shut*, than with *Both Open*. The *Cauſe* is, for that the *Spirits Viſuall* unite themſelves more, and ſo become Stronger. For you may ſee, by looking in a *Glaſſe*, that when you ſhut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth.

869 The *Eyes*, if the *Sight* meet not in one *Angle*, *See Things Double*. The *Cauſe* is, for that *Seeing* two Things, and *Seeing* one Thing twice, worketh the ſame *Effect*: And therefore a little *Pellet*, held between two *Fingers*, laid a croſſe, ſeemeth *Double*.

870 *Pore-Blinde Men*, ſee beſt in the *Dimmer Light*; And likewiſe have their *Sight* Stronger neere hand, than thoſe that are not *Pore-blinde*; And can Reade and Write ſmaller *Letters*. The *Cauſe* is, for that the *Spirits Viſuall*, in thoſe that are *Pore-Blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* diſperſeth them. For the ſame *Cauſe* they need Contracting; But being *Contracted*, are more ſtrong, than the *Viſuall Spirits* of Ordinary *Eyes* are; As when we ſee thorow a *Levell*, the *Sight* is the Stronger: And ſo is it, when you gather the *Eye-lids* ſomewhat cloſe: And it is commonly ſeen in thoſe that are *Pore-Blinde*, that they doe much gather the *Eye-Lids* together. But *Old Men*, when they would ſee to Read, put the Paper ſomewhat a farre off. The *Cauſe* is, for that *Old Mens Spirits Viſuall*, contrary to thoſe of *Pore-blind Men*, unite not, but when the *Object* is at ſome good diſtance, from their *Eyes*.

871 *Men* ſee better, when their *Eyes* are over-againſt the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reaſon is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfuſed* is enough for the *Perception*. For we ſee, that an *Over-light* maketh the *Eyes* Dazell; Inſomuch as Perpetuall Looking againſt the *Sunne*, would Cauſe *Blindneſſe*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwiſe, if they come out of a *Darke Roome*, into a

Light

Light Roome, they ſeeme to have a *Miſt* before their *Eyes*, and ſee worſe than they ſhall doe, after they have ſtayed a little while, either in the *Light*, or in the *Darke*. The *Cauſe* is, for that the *Spirits Viſuall*, are upon a ſudden Change, diſturbed, and put out of Order; And till they be recollected, do not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* ſuddenly; And when they are much *Contracted* by *Darkneſſe*, they cannot *Dilate* ſuddenly: And Exceſſe of both theſe, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Viſuall*,) if it be long, Deſtroyeth the *Eye*. For as long looking againſt the *Sunne*, or *Fire* hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumnes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

It hath been obſerved, that in *Anger*, the *Eyes* wax *Red*; And in *Bluſhing*, not the *Eyes*, but the *Eares*, and the *Parts* behind them. The *Cauſe* is, for that in *Anger*, the *Spirits* aſcend and wax Eager; Which is moſt eaſily ſeen in the *Eyes*, becauſe they are Tranſlucide; Though withall it maketh both the *Cheekes* and the *Gils Red*; But in *Bluſhing*, it is true, the *Spirits* aſcend likewiſe to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulſed by the *Eyes*, for that the *Eyes*, in Shame doe put back the *Spirits*, that aſcend to them, as unwilliugly to looke abroad: For no *Man*, in that *Paſſion*, doth looke ſtrongly, but Dejectedly; And that *Repulſion* from the *Eyes*, Diverteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them. 872

The *Objects* of the *Sight*, may cauſe a great *Pleaſure* aud *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath been ſaid. The *Glimpſes* and *Beames* of *Diamonds* that ſtrike the *Eye*; *Indian Feathers*, that have glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furniſhed; A *Beautifull* Perſon; And the like; doe delight and exhilerate the *Spirits* much. The *Reaſon*, why it holdeth not in the *Offence*, is, for that the *Sight* is moſt *Spirituall* of the *Senſes*; whereby it hath no *Object* Groſſe enough to offend it. But the *Cauſe* (chiefly) is, for that there be no *Active Objects* to offend the *Eye*. For *Harmonicall Sounds*, and *Diſcordant Sounds*, are both *Active*, and *Poſitive*: So are *Sweet Smels*, and *Stincks*: So are *Bitter*, and *Sweet*, in *Taſtes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blackneſſe*, and *Darkneſſe*, are indeed but *Privatives*; And therefore have little or no *Activity*. Somewhat they doe Conſtriſtate, but very little. 873

Experiment Solitary, touching the *Colour* of the *Sea*, or other *Water*. 874

Water of the *Sea*, or otherwiſe, looketh *Blacker* when it is moved, and *Whiter* when it reſteth. The *Cauſe* is, for that by means of the *Motion*, the *Beames* of light paſs not Straight, and therefore muſt be darkened; whereas, when it reſteth, the *Beames* doe paſſe Straight. Beſides, *Splendour* hath a *Degree* of *Whiteneſſe*; Eſpecially if there be a little *Repercuſſion*: For a *Looking-Glaſſe* with the *Steele* behinde, looketh *Whiter* than *Glaſſe Simple*. This *Experiment* deſerveth to be driven further, in Trying by what Means *Motion* may hinder *Sight*.

Experiment Solitarie, touching *Shell-Fiſh*. 875

Shell-Fiſh have been, by ſome of the *Ancients*, compared and ſorted with the *Inſecta*; But I ſee no reaſon why they ſhould; For they have *Male*, and *Female*, as other *Fiſh* have: Neither are they bred of *Putrefaction*; Eſpecially ſuch as doe Move. Nevertheleſſe it is certain, that *Oyſters*, and *Cockles*, and *Muſſles*, which move not, have not diſcriminate *Sex*. *Quare* in what time, and how they are bred? It ſeemeth that *Shels* of *Oyſters* are bred where none

none were before; And it is tried, that the great *Horſe-Muſle*, with the fine ſhell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is ſtrange, it hath been tried, that they doe not onely Gape and Shut, as the *Oiſters* doe, but Remove from one Place to Another.

Experiment Solitary, touching the *Right Side* and the *Left*. 876

THe *Senſes* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are Stronger. The *Cauſe* may be, for that the *Brain* which is the *Inſtrument* of *Senſe*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Moving*, are ſomewhat holpen from the *Liver*, which lieth on the *Right-Side*. It may be alſo, for that the *Senſes* are put in *Exerciſe*, indifferently, on both *Sides* from the Time of our Birth; But the *Limmes* are uſed moſt on the *Right Side*, whereby *Cuſtome* helpeth, For we ſee, that ſome are *Left Handed*: Which are ſuch as have uſed the *Left-Hand* moſt.

Experiment Solitary touching *Frictions*. 877

FRictions make the *Parts* more *Fleſhie*, and *Full*: As we ſee both in *Men*: And in the *Currying* of *Horſes*, &c. The *Cauſe* is, for that they draw greater *Quantity* of *Spirits* and *Bloud* to the *Parts*: And again, becauſe they draw the *Aliment* more forcibly from within: And again, becauſe they relax the *Pores*, and ſo make better *Paſſage* for the *Spirits*, *bloud*, and *Aliment*: Laſtly, becauſe they diſſipate, and diſgeſt any *Inutile* or *Excrementitious Moiſture*, which lieth in the *Fleſh*: All which help *Aſſimulation*. *Frictions* alſo doe more *Fill*, and *Impinguate* the *Body*, than *Exerciſe*. The *Cauſe* is, for that in *Frictions*, the *Inward Parts* are at reſt; Which in *Exerciſe* are beaten (many times) too much: And for the ſame Reaſon, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleſhie*, becauſe they ſtirre the *Limmes* more, and the *Inward Parts* leſſe.

Experiment Solitary touching *Globes* appearing *Flat* at *Diſtance*. 878

ALL *Globes* afarre off appeare *Flat*. The *Cauſe* is, for that *Diſtance*, being a *Secundary Object of Sight*, is not otherwiſe diſcerned, than by more or leſſe *Light*; which *Diſparity* when it cannot be diſcerned, all ſeemeth *One*: As it is (generally) in *Objects* not diſtinctly diſcerned; For ſo *Letters*, if they be ſo farre off, as they cannot be diſcerned, ſhew but as a *Duskiſh Paper*: And all *Engravings*, and *Emboſſings*, (a farre off) appear *Plain*.

Experiment Solitary touching *Shadowes* 879

THe *Uttermoſt Parts* of *Shadowes* ſeeme ever to *Tremble*. The *Cauſe* is, for that the little *Moats*, which we ſee in the *Sunne*, doe ever Stirre, though there be no *Wind*; And therefore thoſe Moving, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe ſhew the *Shadow* to Move, becauſe the *Medium* Moveth.

Experiment Solitary, touching the *Rowing* and *Breaking* of the *Seas*. 880

Shallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cauſe* is, for that the *Impulſion* being the ſame in Both; Where there is greater *Quantity* of *Water*, and likewiſe Space Enough; there the *Water* Rowleth, and Moveth, both more Slowly, and with a Sloper Riſe, and Fall: But where there is leſſe *Water*, and leſſe Space, and the *Water* daſheth more againſt the bottome; there it moveth more Swiftly, and more in *Precipice*; For in the *Breaking* of the *Waves* there is ever a *Precipice*.

Experiment Solitary, touching the *Dulceration* of *Salt-Water*. 881

IT hath beene obſerved by the *Ancients*, that *Salt-Water Boyled*, or *Boyled* and *Cooled* again, is more *Potable*, than of it ſelfe *Raw*: And yet the *Taſte* of *Salt*, in *Diſtillations* by *Fire*, riſeth not; For the *Diſtilled Water* will be *Freſh*.

Freſh. The *Cauſe* may be, for that the *Salt Part* of the *Water*, doth partly riſe into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome*: And ſo is rather a *Separation*, than an *Evaporation*. But it is too groſſe to riſe into a *Vapour*: And ſo is a *Bitter Taſte* likewiſe; For Simple *Diſtilled Waters* of *Worme-wood*, and the like, are not Bitter.

Experiment Solitary, touching the *Returne* of *Saltneſſe* in *Pits* upon the *Sea-Shore*. 882

IT hath beene ſet downe before, that *Pits* upon the *Sea-Shoare*, turne into *Freſh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by ſome of the *Ancients*, that in ſome Places of *Affricke*, after a time, the *Water* in ſuch *Pits* will become *Brakiſh* againe. The *Cauſe* is, for that after a time, the very *Sands*, thorow which the *Salt-Water* paſſeth, become *Salt*; And ſo the *Strainer* it ſelfe is tincted with *Salt*. The Remedy therefore is, to digge ſtill *New Pits*, when the old wax *Brackiſh*; as if you would change your *Strainer*.

Experiment Solitarie, touching *Attraction* by *Similitude* of *Subſtance*. 883

IT hath been obſerved by the *Ancients*, that *Salt-Water*, will diſſolve *Salt* put into it, in leſſe time, than *Freſh Water* will diſſolve it. The *Cauſe* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Subſtance*, draw the *Salt* new put in, unto it; Whereby it diffuſeth in the *Liquor* more ſpeedily. This is a Noble *Experiment*, if it be true; For it ſheweth Meanes of more Quicke and Eaſie *Infuſions*; And it is likewiſe a good *Inſtance* of *Attraction*, by *Similitude* of *Subſtance*. Trie it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Unſugred*.

Experiment Solitary touching *Attraction*. 884

PUt *Sugar* into *Wine*, part of it above, part under the *Wine*; And you ſhall finde, (that which may ſeeme ſtrange,) that the *Sugar* above the *Wine*, will ſoften and diſſolve ſooner, than that within the *Wine*. The *Cauſe* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is under the *Wine*, by Simple *Infuſion*, or *Spreading*; But that *Part* above the *Wine*, is likewiſe forced by *Sucking*: For all ſpungie *Bodies* expell the *Aire*, and draw in *Liquor*, if it be Contiguous: As we ſee it alſo in *Spunges*, put part above the *Water*. It is worthy the Inquiry, to ſee how you may make more *Accurate Infuſions*, by Helpe of *Attraction*.

Experiment Solitary touching *Heat* under *Earth*. 885

VVAter in *Wels* is *Warmer* in *Winter*, than in *Summer*: And ſo *Aire* in *Caves*. The *Cauſe* is, for that in the Higher *Parts*, under the *Earth*, there is a *Degree* of ſome *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which ſhut cloſe in, (as in *Winter*,) is the More; But if it Perſpire, (as it doth in *Summer*,) it is the leſſe.

Experiment Solitary touching *Flying* in the *Aire*. 886

IT is reported, that amongſt the *Leucadians*, in *Ancient* time, upon a Superſtition they did uſe to Precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with Strings, at ſome diſtance, many great *Fowles*; And fixing unto his *Body* divers *Feathers*, ſpred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare up a good *Weight*, as they flie; And *Spreading* of *Feathers* thinne, and cloſe, and in great Breadth, will likewiſe beare up a great *Weight*; Being even laid, without Tilting upon the Sides. The further *Extenſion* of this *Experiment* for *Flying* may be thought upon.

Experiment Solitary, touching the *Dye* of *Scarlet*. 887

THere is, in ſome Places, (namely in *Cephalonia*;) a little *Shrub*, which they call *Holy-Oake*, or *Dwarfe-Oake*: Upon the *Leaves* whereof there riſeth

ſeth a *Tumour*, like a *Bliſter*; Which they gather, and rub out of it, a certaine *Red Duſt*, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to Quicken: With this *Duſt* they die *Scarlet*.

Exp er Solitary touching *Maleficiating*. 888

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany with their *Wives*. The like is Practiſed in *Gaſconie*; Where it is called *Nover l' eguillete*. It is practiſed alwayes upon the *Wedding Day*. And in *Zant*, the Mothers themſelves doe it, by way of Prevention; Becauſe thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civill Law* taketh knowledge of; And therefore is of no Light Regard.

Experiment Solitary, touching the *Riſe* of *Water* by *Meanes* of *Flame*. 889

IT is a Common *Experiment*, but the *Cauſe* is miſtaken. Take a *Pot*, (Or better a *Glaſſe*, becauſe therein you may ſee the *Motion*,) And ſet a *Candle* lighted in the *Bottome* of a *Baſon* of *Water*; And turne the *Mouth* of the *Pot*, or *Glaſſe*, over the *Candle*, and it will make the *Water* riſe. They aſcribe it to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as ſoone as it is covered, being ſuffocated by the *Cloſe Aire*, leſſeneth by little and little: During which time, there is ſome little Aſcent of *Water*, but not much: For the *Flame* Occupying leſſe and leſſe Roome, as it leſſeneth, the *Water* ſucceedeth. But upon the *Inſtant* of the *Candles Going out*, there is a ſudden *Riſe*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more Place; And ſo the *Aire*, and the *Water* ſucceed. It worketh the ſame *Effect*, if in ſtead of *Water*, you put *Flower*, or *Sand*, into the *Baſon*: Which ſheweth, that it is not the *Flames* Drawing the *Liquour*, as *Nouriſhment*; As it is ſuppoſed; For all *Bodies* are alike unto it; As it is ever in *Motion* of *Nexe*; Inſomuch as I have ſeen the *Glaſſe*, being held by the Hand, hath lifted up the *Baſon*, and all: The *Motion* of *Nexe* did ſo Claſp the *Bottome* of the *Baſon*. That *Experiment*, when the *Baſon* was lifted up, was made with *Oyle*, and not with *Water*: Nevertheleſſe this is true, that at the very firſt *Setting* of the *Mouth* of the *Glaſſe*, upon the *Bottome* of the *Baſon*, it draweth up the *Water* a little, and then ſtandeth at a Stay, almoſt till the *Candles Going out*, as was ſaid. This may ſhew ſome *Attraction* at firſt: But of this we will ſpeake more, when we handle *Attractions* by *Heat*.

Experiments in Conſort, touching the *Influences* of the *Moone*.

Of the *Power* of the *Celeſtial Bodies*, and what more Secret *Influences* they have, beſides the two Manifeſt *Influences* of *Heat*, and *Light*, We ſhall ſpeake, when we handle *Experiments* touching the *Celeſtial Bodies*: Mean-while, we will give ſome Directions for more certaine *Trials*, of the *Vertue* and *Influences* of the *Moon*; which is our *Neareſt Neighbour*.

The *Influences* of the *Moon*, (moſt obſerved,) are Foure, The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: The *Increaſe* of *Moiſture*: The *Exciting* of the *Motions* of *Spirits*.

For

890 For the *Drawing forth* of *Heat*, we have formerly prescribed to take *VVater VVarme*, and to set Part of it against the *Moone Beames*, and Part of it with a *Skreene* betweene; And to see whether that which standeth Exposed to the *Beames*, will not *Coole* sooner. But because this is but a Small *Interposition*, (though in the *Sunne* we see a Small *Shade* doth much,) it were good to trie it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water VVarme* in a *Glasse-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c.

891 For the *Inducing* of *Putrefaction*, it were good to trie it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth not for the like time; To see whether will corrupt sooner: And trie it also with *Capon*, or some other *Fowle* laid abroad to see whether it will mortifie, and become tender sooner? Trie it also with Dead *Flies*, or dead *Wormes*, having a little *VVater* cast upon them, to see whether will *Putrefie* sooner. Trie it also with an *Apple*, or *Orenge*, having *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Trie it also with *Holland Cheese*, having *VVine* put into it, whether will breed *Mites* sooner or greater?

892 For the *Increase* of *Moisture*, the Opinion Received is; That *Seeds* will grow soonest; And *Haire*, and *Nailes*, and *Hedges*, and *Herbs*, Cut, &c. Will grow soonest; if they be Set, or Cut, in the *Increase* of the *Moone*. Also that *Braines* in *Rabits*, *VVood-Cocks*, *Calves*, &c. are fullest in the *Ful* of the *Moone*: and so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you have them in *pits*.

893 Take some *Seeds*, or *Roots*, (as *Onions*, &c.) And set some of them immediately after the *Change*; and others of the same kinde immediately after the *Full*: Let them be as Like as can be: The *Earth*, also the Same as neare as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what Time, the *Seeds Set* in the *Increase* of the *Moone*, come to a certaine Height; And how they differ from those that are *Set* in the *Decrease* of the *Moone*.

894 It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, upon the *Full* of the *Moone*: And therefore it were good for those that have *Moist Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloes*, *Rose-Mary*, *Frankincense*, &c. about the *Full* of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the *Full*; For that then the *Humours* will not repleni sh so soone againe.

895 As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*.

896 There may be other Secret *Effects* of the *Influence* of the *Moone*, which are not yet brought into *Observation*. It may be, that if it so fall out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South-VVest*, it disposeth the *Aire*, for a good while, to *VVarmth*, and *Raine*; Which would be observed.

897 It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, and larger then those that are brought forth in the *VVane*: And those also which are *Begotten* in the *Full* of the *Moone*; So that it might be good *Husbandrie*, to put *Rammes*, and *Bulls* to their

Females, ſomewhat before the *Full* of the *Moone*. It may be alſo, that the *Egges* lay'd in the *Full* of the *Moone*, breed the better *Birds*: And a Number of the like *Effects*, which may be brought into *Obſervation*: *Quære* alſo, whether great *Thunders*, and *Earth-Quakes*, be not moſt in the *Full* of the *Moone*.

Experiment Solitary, touching *Vinegar* 898

THe *Turning* of *Wine* to *Vinegar*, is a Kind of *Putrefaction*: And in *Making* of *Vinegar*, they uſe to ſet *Veſſels* of *Wine* over againſt the *Noone-Sunne*; which calleth out the more *Oylie Spirits*, and leaveth the *Liquor* more *Soure*, and *Hard*. We ſee alſo, that *Burnt Wine* is more *Hard*, and *Aſtringent*, than *Wine Vnburnt*. It is ſaid that *Cider* in *Navigations* under the *Line* ripeneth, when *Wine* or *Beere* ſowreth. It were good to ſet a *Rundlet* of *Verjuyce* over againſt the *Sunne*, in *Summer*, as they do *Vinegar*, to ſee whether it will Ripen, and Sweeten.

Experiment Solitary, touching *Creatures* that *Sleep* all *Winter*. 899

THere be divers *Creatures*, that *Sleepe* all *Winter*; As the *Beare* the *Hedge-hog*, the *Bat*, the *Bee*, &c. theſe all wax *Fat* when they *Sleepe*, and egeſt not. The *Cauſe* of their *Fattening*, during their *Sleeping time*, may be the *Want* of *Aſſimilating*; For whatſoever *Aſſimilateth* not to *Fleſh*, turneth either to *Sweat*, or *Fat*. Theſe *Creatures*, for part of their *Sleeping-Time*, have beene obſerved not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remove*. And they get *VVarme* and *Cloſe Places* to *Sleep* in. When the *Flemmings* Wintred in *Nova Zembla*, the *Beares*, about the Middle of *November*, went to *Sleepe*, And then the *Foxes* began to come forth, which durſt not before. It is noted by ſome of the *Ancients*, that the *Shee-Beare* breedeth, and lyeth in with her Young, during that time of *Reſt*: And that a *Beare*, *Big* with *Young*, hath ſeldome beene ſeene.

Experiment Solitary touching the *Generation* of *Creatures* by *Copulating*, and by *Putrefaction*. 900

SOme *Living Creatures* are procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of thoſe which come by *Putrefaction*, many do (neverthleſſe) afterwards procreate by *Copulation*. For the *Cauſe* of both *Generations*: Firſt, it is moſt certaine, that the *Cauſe* of all *Vivification*, is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Yeelding Subſtance*: For the *Heat* doth bring forth *Spirit* in that *Subſtance*: And the *Subſtance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Yeelding*, is driven forwards by the *Motion* of the *Spirits*, after ſome *Swelling* into *Shape*, and *Members*. Therefore all *Sperme*, al *Menſtruous Subſtance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, have evermore a *Cloſeneſſe*, *Lentour*, and *Sequacitie*. It ſeemeth therefore, that the *Generation* by *Sperme onely*, and by *Putrefaction*, have two Different *Cauſes*. The firſt is, for that *Creatures*, which have a *Definite* and *Exact Shape*, (as thoſe have which are Procreated by *Copulation*,) cannot be produced by a *VVeake*, and *Caſuall Heat*; Nor out of *Matter*, which is not *Exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vivification* be of any length, then the *Spirit* will Exhale, before the *Creature* be *Mature*: Except it be incloſed in a *Place* where it may have *Continuance* of the *Heat*, *Acceſſe* of ſome *Nouriſhment* to maintaine it, and *Cloſeneſſe* that may keepe it from *Exhaling*. And ſuch

Places

Places, or the *Wombs*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Vncertaine Shape*; And are made in *Shorter Time*; And need not ſo Perfect an *Encloſure*, though ſome *Cloſeneſſe* be commonly required. As for the *Heathen Opinion*, which was, that upon great *Mutations* of the *World*, *Perfect Creatures* were firſt Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and ſuch like, are now; We know it to be vaine: But if any ſuch Thing ſhould be admitted, Diſcourſing according to *Senſe*, it cannot be, except you admit of a *Chaos* firſt, and *Commixture* of *Heaven* and *Earth*: For the *Frame* of the *World* once in Order, cannot effect it by any *Exceſſe* or *Caſualty*.

NATV-

NATVRALL HISTORIE.

X. Century.

THe *Philoſophie* of *Pythagoras*, (which was full of *Superſtition*,) did firſt plant a *Monſtrous Imagination*, which afterwards was, by the *Schoole* of *Plato*, and Others, Watred, and Nouriſhed. It was, That the *World* was *One, Entire, Perfect, Living Creature*; Inſomuch as *Apollonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing* and *Flowing* of the *Sea*, was the *Reſpiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Living Creature*, it had a *Soule*, and *Spirit*; Which alſo they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deity* beſides:) But onely the *Soule*, or *Eſſentiall Forme* of the *Vniverſe*. This *Foundation* being laid, they mought build upon it, what they would; For in a *Living Creature*, though never ſo great, (As for example, in a great *Whale*,) the *Senſe*, and the *Affects* of any one *Part* of the *Body*, inſtantly make a *Tranſcurſion* thorow-out the whole *Body*: So that by this they did inſinuate, that no diſtance of *Place*, nor *Want* or *Indiſpoſition* of *Matter*, could hinder *Magicall Operations*; But that (for example,) we mought here in *Europe*, have *Senſe* and *Feeling* of that, which was done in

Experiments in Conſort, touching *Tranſmiſſion* and *Influx*, of *Immateriate Vertues*, and the *Force* of *Imagination*.

in *China* : And likewiſe, we mought worke any *Effect*, *without* and *againſt Matter* : And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but onely by the *Vnitie* and *Harmony* of *Nature*. There were ſome alſo, that ſtaid not here; but went further, and held; That if the *Spirit* of *Man*, (whom they call the *Microcoſme*,) doe give a fit touch to the *Spirit* of the *World*, by ſtrong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelſus* and ſome darkſome *Authors*, of *Magicke*, doe aſcribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With theſe Vaſt and Bottomleſſe *Follies*, *Men* have beene (in part) entertained.

But wee, that hold firme to the *Works* of *God*; And to the *Senſe*, which is *Gods Lamp*; (*Lucerna Dei Spiraculum Hominis*;) will enquire, with all *Sobrietie*, and Severity, whether there be to be found, in the Foot-ſteps of *Nature*, any ſuch *Tranſmiſſion* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either upon the *Body Imaginant*, or upon another *Body* : Wherein it will be like that *Labour* of *Hercules*, in Purging the *Stable* of *Augeas*, to ſeparate from *Superſtitious*, and *Magicall Arts*, and *Obſervations*, any thing that is cleane, and pure *Naturall*; And not to be either Contemned, or Condemned. And although we ſhall have occaſion to ſpeake of this in more Places than One, yet we will now make ſome Entrance thereinto.

Experiments in Conſort, *Monitorie*, touching *Tranſmiſſion* of *Spirits*, and the *Force* of *Imagination*.

901 *Men* are to be Admoniſhed, that they do not with-draw Credit, from the *Operations* by *Tranſmiſſion* of *Spirits*, and *Force* of *Imagination*, becauſe the *Effects faile ſometimes*. For as in *Infection*, and *Contagion*, from *Body* to *Body*, (as the *Plague*, and the like,) it is moſt cerain, that the *Infection* is received (many times) by the *Body paſſive*, but yet is by the *Strength*, and good *Diſpoſition* thereof, Repulſed, nd wronght out, before it be formed in a *Diſeaſe*; So much more in *Impreſſions* from *Mind* to *Mind*, or from *Spirit* to *Sprit*, the *Impreſſion* taketh, but is Encountred, and Overcome, by the *Mind* and *Spirit*, which is *Paſſive*, before it work any manifeſt *Effect*. And therefore they work moſt upon *Weake Mindes*, and *Spirits* : As thoſe of *Women*, *Sicke Perſons*; *Superſtitious* and *Fearfull Perſons*; *Children* and *Young Creatures*:

Neſcio quis teneros oculus mihi faſcinat Agnos:

The *Poet* ſpeaketh not of *Sheep*, but of *Lambs*. As for the *Weakneſſe* of the *Power* of them, upon *Kings*, and *Magiſtrates*; It may be aſcribed (beſides the main, which is the *Protection* of *God*, over thoſe that Execute his Place,) to the *Weakneſſe* of the *Imagination* of the *Imaginant* : For it is hard for a *Witch*, or a *Sorcerer*, to put on a Beliefe, that they can hurt ſuch *Perſons*.

902 *Men* are to be admoniſhed, on the other ſide, that they doe not eaſily give Place and Credit to theſe *Operations*, becauſe they *Succeed many times*.

For

For the *Cauſe* of this *Succeſſe*, is (oft) to be truely aſcribed, unto the *Force* of *Affection* and *Imagination*, upon the *Body Agent*; And then by a *Secondary Meanes*, it may work upon a *Divers Body*: As for Example; If a *Man* carry a *Planets Seale*, or a *Ring*, or ſome *Part* of a *Beaſt*, beleeving ſtrongly, that it will help him to obtain his *Love*; Or to keep him from danger of hurt in *Fight*; or to prevaile in a *Suit*; &c. it may make him more *Active*, and *Induſtrious*; And again, more *Confident*, and *Perſiſting*, then otherwiſe he would be. Now the great *Effects* that may come of *Induſtry*, and *Perſeverance*, (eſpecially in *Civill Buſineſſe*,) who knoweth not? For we ſee *Audacity* doth almoſt bind and mate the *Weaker Sort* of *Mindes*; And the *Sate* of *Humane Actions* is ſo variable, that to try things oft, and never to give over, doth Wonders: Therefore it were a Meere *Fallacy* and *Miſtaking*, to aſcribe that to the *Force* of *Imagination*, upon another *Body*, which is but the *Force* of *Imagination* upon the Proper *Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, work greatly upon the *Body* of the *Imaginant*: As we ſhall ſhew in due place

Men are to be Admoniſhed, that as they are not to miſtake the *Cauſes* of theſe *Operations*; So, much leſſe, they are to miſtake the *Fact*, or *Effect*; 903
And raſhly to take that for done, which is not done. And therefore, as divers wiſe *Iudges* have preſcribed, and cautioned, *Men* may not too raſhly beleeve, the *Confeſſion* of *Witches*, nor yet the *Evidence* againſt them. For the *Witches* themſelves are *Imaginative*, and beleeve oft-times, they doe that, which they do not: And *People* are *credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-craft*, It is worthy the Obſerving, that both in *Ancient*, and *Late times*; (As in the *Theſſalian Witches*, and the Meetings of *Witches* that have been recorded by ſo many late *Confeſſions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themſelves into other *Bodies*; &c. are ſtill reported to be wrought, not by *Incantation* or *Ceremonies*; but by *Ointments*, and *Annointing* themſelves all over. This may juſtly move a *Man* to think, that theſe *Fables* are the *Effects* of *Imagination*: For it is certain, that *Ointments* do all, (if they be laid on any thing thick,) by *Stopping* of the *Pores*, ſhut in the *Vapours*, and ſend them to the *Head* extremely. And for the Particular *Ingredients* of thoſe *Magicall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Neck*, *Feet*, *Back-Bone*, we know is uſed for Procuring *Dead Sleeps*: And if any *Man* ſay, that this *Effect* would be better done by Inward *Potions*; Anſwer may be made, that the *Medicines*, which go to the *Ointments*, are ſo ſtrong, that if they were uſed inwards, they would kill thoſe that uſe them: And therefore they worke Potently, though Outwards.

We will divide the Severall Kindes of the *Operations*, by *Tranſmiſſion* of *Spirits*, and *Imagination*; Which will give no ſmall Light to the *Experiments* that follow. All *Operations* by *Tranſmiſſion* of *Spirits*, and *Imagination* have this; That they *Worke* at *Diſtance*, and not at *Touch*; And they are theſe being diſtinguiſhed.

The Firſt is the *Tranſmiſſion* or *Emiſſion*, of the *Thinner* and more *Airy* 904
Parts of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the reſt, the moſt *Corporeal*. But you muſt remember withal, that there be a number of thoſe *Emiſſions*, both *Vnwholeſome*, and *Wholeſome*, that give no *Smell* at all:

For

For the *Plague*, many times when it is taken, giveth no *Sent* at all: And there be many *Good* and *Healthful Aires*, that do appeare by *Habitation*, and other Proofes, that differ not in *Smell* from other *Aires*. And under this Head, you may place all *Imbibitions* of *Aire*, where the *Subſtance* is *Materiall*, *Odour-like*; Whereof ſome nevertheleſſe are ſtrange, and very ſuddenly diffuſed; as the *Alteration* which the *Aire* receiveth in *Egypt*, almoſt immediately, upon the *Riſing* of the *River* of *Nilus*, whereof we have ſpoken.

905 The Second is, the *Tranſmiſſion* or *Emiſſion* of thoſe *Things* that we call *Spirituall Species*; As *Viſibles*, and *Sounds*: The one whereof we have handled; and the other we ſhall handle in due place. Theſe move ſwiftly, and at great diſtance; But then they require a *Medium* well diſpoſed; And their *Tranſmiſſion is* eaſily ſtopped.

906 The third is the *Emiſſions*, which cauſe *Attraction* of *Certaine Bodies* at *Diſtance*; Wherein though the *Loadſtone* be commonly placed in the Firſt Rank, yet we think good to except it, and referre it to another *Head*: but the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at diſtance; And the *Attraction* of *Heat* at diſtance; And that of *Fire* to *Naphtha*; And that of ſome *Herbs* to *Water*, though at diſtance; And divers others; Wee ſhall handle, but yet not under this preſent *Title*, but under the *Title* of *Attraction* in generall.

907 The Fourth is the *Emiſſion* of *Spirits*, and *Immateriate Powers* and *Vertues*,, in thoſe Things which worke by the *Vniverſall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celeſtiall Influxes*, (as is vainly taught and received,) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kind is, (as we yet ſuppoſe,) the *Working* of the *Load-Stone*, which is by *Conſent* with the *Globe* of the *Earth*: Of this kinde is the *Motion* of *Gravitie*, which is by *Conſent* of *Denſe Bodies*, with the *Globe* of the *Earth*: Of this kind is ſome *Diſpoſition* of *Bodies* to *Rotation*, and particularly from *Eaſt* to *Weſt*: Of which kind we conceive the *Maine Float* and *Refloat* of the *Sea* is, which is by *Conſent* of the *Vniverſe*, as Part of the *Diurnal Motion*. Theſe *Immateriate Vertues* have this Property differing from other; That the *Diverſity* of the *Medium* hindereth them not; But they paſſe through all *Mediums*; yet at *Determinate Diſtances*. And of theſe we ſhall ſpeake, as they are incident to ſeverall *Titles*.

908 The Fifth is, the *Emiſſions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, upon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be Vehement; And the *Operation* of the *Imagination*, if it be Strong. But theſe two are ſo *Coupled*, as we ſhal handle them together; For when an *Envious* or *Amorous Aſpect*, doth infect the *Spirits* of Another, there is Joyned both *Affection*, and *Imagination*.

909 The Sixth is, the Influxes of the *Heavenly Bodies*, beſides thoſe two Manifeſt Ones, of *Heat*, and *Light*, But theſe we will handle, where we handle the *Celeſtiall Bodies*, and *Motions*.

910 The Seventh is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* have brought into an *Art*, or *Precept*: And it is this; That if you deſire to Super-induce, any *Vertue* or *Diſpoſition*, upon a *Perſon*, you ſhould take the *Living Creature*, in which that *Vertue* is moſt *Eminent* and in *Perfection*: Of that *Creature* you muſt take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you muſt take the *Parts*, in the *Time*, and *Act* when that *Vertue* is moſt in *Exerciſe*; And then you muſt apply it to that,

Part

Part of *Man*, wherein that *Vertue* chiefly *Conſiſteth*. As if you would Superinduce *Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take thoſe *Parts* immediately after the *Lion*, or the *Cock* have been in *Fight*; And let them be worn, upon a *Mans Heart*, or *Wreſt*. Of theſe and ſuch like *Sympathies*, we ſhall ſpeak under this preſent *Title*.

The Eighth and laſt is, an *Emiſſion* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is ſo prodigious: But that it is ſo conſtantly avouched by many: And we have ſet it downe, as a Law to our Selves, to examine things to the Bottome; And not to receive upon Credit, or reject upon Improbabilities, until there hath paſſed a due Examination. This is, the *Sympathy* of *Individuals*: For as there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things* that have been once *Contiguous*, or *Entire*, there ſhould remain a *Tranſmiſſion* of *Vertue* from the one to the other: As between the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Teli*: And ſo of a *Peece* of *Lard*, or *Stick* of *Elder*, &c. that if *Part* of it be Conſumed or Putrified, it will worke upon the other *Part Severed*. Now we will purſue the *Inſtances* themſelves. 911

THe *Plague* is many times taken without *Manifeſt Senſe*, as hath beene ſaid. And they report, that where it is found, it hath a Sent, of the *Smel* of a *Mellow Apple*; And (as ſome ſay) of *May Flowers*: And it is alſo received, that *Smels* of *Flowers* that are *Mellow* and *Luſhious*, are il for the *Plague*; As *White-Lillies*, *Cowſlips*, and *Hyacinths*. Experiments in Conſort touching *Emiſſion* of *Spirits* in *Vapour*, or *Exhalation*, *Odour-like*.

The *Plague* is not eaſily received by ſuch, as continually are about them, that have the *Plague*; As *Keepers* of the *Sicke*, and *Phyſitians*; Nor againe by ſuch as take *Antidotes*, either Inward, (as *Mithridate*, *Juniper-Berries*, *Rue*, *Leafe*, and *Seed*, &c.) Or Outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and ſuch as are of a *Drie* and *cold complexion*. On the other ſide, the *Plague* taketh ſooneſt hold of thoſe that come out of a *Freſh Ayre*; and of thoſe that are *Faſting*; and of *children*; And it is likewiſe noted to goe in a *Bloud*, more then to a *Stranger*. 912 913

The moſt pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*; When *Priſoners* have been Long, and Cloſe, and Naſtily kept; Whereof we have had, in our time, experience, twice or thrice; when both the *Iudges* that ſate upon the *Iayle*, and *Numbers* of thoſe that attended the Buſineſſe, or were preſent, *Sickned* upon it, & *died*. Therefore it were good wiſdom, that in ſuch Caſes, the *Iayle* were Aired, before they be brought forth. 914

Out of queſtion, if ſuch *Foule Smels* be made by *Art*, and by the Hand, they conſiſt chiefly of *Mans Fleſh*, or *Sweat*, *Putrified*: For they are not thoſe *Stinks*, which the *Noſtrils* ſtraight abhor, and expell, that are moſt *Pernicious*; But ſuch *Aires*, as have ſome ſimilitude with *Mans body*; And ſo inſinuate themſelves, and betray the *Spirits*. There may be great danger, in uſing ſuch Compoſitions, in great Meetings of People, within Houſes; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poyſoning* of *Aire* is no leſſe dangerous than *Poyſoning* of *Water*; Which hath been uſed by the *Turks* in the Warres; And was uſed by *Emanuel Comnenus* towards the *Chriſtians*, when they paſſed thorow his *Countrey* to the *Holy Land*. And theſe *Empoyſonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Becauſe the much *Breath* of *People*, doth further the *Reception* of 915

the

the *Infection*: And therefore, when any ſuch thing is feared, it were good, thoſe *Publique Places* were perfumed before the *Aſſemblies*.

916 The *Empoyſonment* of Particular *Perſons*, by *Odours*, hath been reported to be in *Perfumed Gloves*, or the like. And it is like, they mingle the *Poyſon* that is deadly, with ſome *Smels* that are Sweet, which alſo maketh it the ſooner received. *Plagues* alſo have been raiſed by *Annointings* of the *Chincks* of *Doores*, and the like; Not ſo much by Touch, as for that it is common for *Men*, when they finde any thing Wet upon their Fingers, to put them to their *Noſe*; Which Men therefore ſhould take heed how they doe. The beſt is, that theſe *Compoſitions* of *Infectious Aires* cannot be made without *Dangers* of *Death*, to them that make them. But then againe, they may have ſome *Antidotes* to ſave themſelves; So that *Men* ought not to be ſecure of it.

917 There have been, in divers *Countries*, great *Plagues* by the *Putrefaction*, of great *Swarmes* of *Graſſe-Hoppers*, and *Locuſts*, when they have beene dead, and caſt upon Heaps.

918 It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poyſonous Nature* of the *Minerall*: And thoſe that deale much in *Refining*, or other Worke about *Metals*, and *Minerals*, have their *Braines* Hurt and Stupefied by the *Metalline Vapours*. Amongſt which it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; Inſomuch as *Gilders* uſe to have a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of *Quick-ſilver*; Which *Gold* afterwards they finde to be Whitened. There are alſo certaine *Lakes*, and *Pits*, ſuch as that of *Avernus*, that *Poyſen Birds*, (as is ſaid,) which fly over them; Or *Men*, that ſtay too long about them.

919 The *Vapour* of *Char-coale*, or *Sea-coale*, in a Cloſe Roome, hath killed many: And it is the more dangerous, becauſe it commeth without any *Ill Smell*; But ſtealeth on by little and little; Enducing onely *Faintneſſe*, without any *Manifeſt Strangling*. When the *Dutch-men* Wintred at *Nova Zembla*, and that they could gather no more Sticks, they fell to make Fire of ſome *Sea-coale* they had, wherewith (at firſt) they were much refreſhed; But a little after they had ſat about the *Fire*, there grew a generall Silence and lothneſſe to ſpeake amongſt them; And immediately after, One of the *Weakeſt* of the *Company*, fell downe in a Swoune; Whereupon they doubting what it was, opened their door to let in *Aire*, and ſo ſaved themſelves. The *Effect* (no doubt) is wrought by the *Inſpiſſation* of the *Aire*; And ſo of the *Breath*, and *Spirits*. The like enſueth in *Roomes* newly *Plaiſtered*, if a *Fire* be made in them; Whereof no leſſe *Man* than the *Emperour Iovinianus* Died.

920 *Vide* the *Experiment*, 803. touching the *Infectious Nature* of the *Aire* upon the Firſt *Showres*, after long *Drought*.

921 It hath come to paſſe, that ſome *Apothecaries*, upon *Stamping* of *Coloquintida*, have beene put into a great *Skouring*, by the *Vapour* onely.

922 It hath been a practice, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath ſuch a ſtrong *Spirit*, that it provoketh a *Continuall Sneezing*, in thoſe that are in the *Roome*.

923 It is an *Antient Tradition*, that *Bleare-Eyes* infect *Sound Eyes*; And that a *Menſtruous Woman*, looking in a *Glaſſe*, doth ruſt it. Nay they have an *Opinion*, which ſeemeth *Fabulous*; That *Menſtruous Women*, going over a *Field*, or *Garden*, do *Corne* and *Herbs* good by *Killing* the *Wormes*.

924 The *Tradition* is no leſſe *Ancient*, that the *Baſiliske* killeth by *Aſpect*; And

that

that the *Wolfe*, if he ſee a *Man* firſt, by *Aſpect* ſtriketh a *Man* hoarſe.

Perfumes Covenient doe dry and ſtrengthen the *Brain*; And ſtay *Rheumes*, 925
and *Defluxions*; As we finde in *Fume* of *Roſe-Mary* dried, and *Lignum Aloes*, and *Calamus* taken at the *Mouth*, and *Noſtrils*; And no doubt there be other *Perfumes*, that doe moiſten, and refreſh; And are fit to be uſed in *Burning Agues*, *Conſumptions*, and too much *Wakefulneſſe*; Such as are, *Roſe-Water*, *Vinegar*, *Limon Pills*, *Violets*, the *Leaves* of *Vines* ſprinkled with a little *Roſe-Water*, &c.

They doe uſe in *Sudden Faintings*, and *Swoonings*, to put a *Handkerchiefe* 926
with *Roſe-Water*, or a *Little Vineger*, to the *Noſe*; Which gathereth together againe the *Spirits*, which are upon point to reſolve, and fall away.

Tobacco comforteth the *Spirits*, and diſchargeth *Wearineſſe*; Which it 927
worketh, partly by Opening; But chiefly by the *Opiate Vertue*, which condenſeth the *Spirits*. It were good therefore to trie the *Taking* of *Fumes* by *Piper*, (as they doe in *Tobacco*,) of other *Things*; As well to drie, and comfort, as for other *Intentions*. I wiſh Triall be made of the *Drying Fume*, of *Roſe-Mary*, and *Lignum-Aloes*, before mentioned, in *Pipe*; And ſo of *Nutmeg*, and *Folium Indum*; &c.

The *Following* of the *Plough*, hath been approved, for *Refreſhing* the *Spi-* 928
rits, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not ſo good; becauſe the *Earth* hath ſpent her ſweet *Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it when you ſow *Barley*. But becauſe ploughing is tied to *Seaſons*, it is beſt to take the *Aire* of the *Earth*, new turned up by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may do themſelves much good by kneeling upon a Cuſhion, and *Weeding*. And theſe things you may practice in the beſt *Seaſons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweeteſt Earth* you can chuſe. It would be done alſo, when the *Dew* is a little off the *Ground*, leſt the *Vapour* bee too Moiſt. I knew a great *Man*, that lived Long, who had a Clean *Clod* of *Earth*, brought to him every *Morning*, as he ſate in his *Bed*; And he would hold his *Head* over it, a good pretty while. I commend alſo, ſometimes, in *Digging* of *New Earth*, to poure in ſome *Malmeſey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; provided alwayes, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

They have, in *Phyſicke*, Uſe of *Pomanders*, and *Knots* of *Powders*, for *Dry-* 929
ing of *Rheumes*, *Comforting* of the *Heart*, *Provoking* of *Sleep*, &c. For though thoſe things be not ſo ſtrong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*; And beſides, there be divers *Things*, that breath better of themſelves, than when they come to the *Fire*; As *Nigella Romana*; the *Seed* of *Melanthium*, *Amomum*; &c.

There be two *Things*, which (inwardly uſed) doe Coole and condenſe 930
the *Spirits*; And I wiſh the ſame to be tried outwardly in *Vapours*. The One is *Nitre*, Which I would have diſſolved in *Malmeſey*, or *Greeke-Wine*, and ſo the *Smell* of the *Wine* taken; Or if you would have it more forcible, poure of it upon a *Fire-pan*, well heated, as they do *Roſe-Water* and *Vineger*. The Other is the *Diſtilled Water* of *Wilde Poppey*; which I wiſh to bee mingled, at halfe, with *Roſe-Water*, and ſo taken with ſome *Mixture* of a few *Cloves*, in a *Perfuming-Pan*. The like would be done with the *Diſtilled Water* of *Saffron Flowers*.

Smells

931 *Smells* of *Muske*, and *Amber*, and *Civit*, are thought to further *Venereous Appetite*: which they may doe by the *Refreſhing* and *calling forth* of the *Spirits*.

932 *Incenſe*, and *Nidorous Smells*, (ſuch as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to diſpoſe *Men* to *Devotion*: Which they may doe by a kinde of *Sadneſſe*, and *Contriſtation* of the *Spirits*: And partly alſo by *Heating*, and *Exalting* them. We ſee that amongſt the *Iewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Uſes*.

933 There be ſome *Perfumes*, preſcibed by the *VVriters* of *Naturall Magicke*, which procure *Pleaſant Dreames*; And ſome others (as they ſay,) that procure *Propheticall Dreames*; as the *Seeds* of *Flax*, *Flea-wort*, &c.

934 It is certaine that *Odours* doe, in a ſmall Degree, Nouriſh; Eſpecially the *Odour* of *VVine*: And we ſee *Men* an hungred, doe love to ſmell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *VVoman*, in the Houſe, complaine, that ſhe ſhould be kept from being at a *Feaſt*, and *Solemnity*, (which ſhe much deſired to ſee,) becauſe there would be a *Corps* in the Houſe; Whereupon he cauſed *Loaves* of *New Bread* to be ſent for and opened them; And powred a little *VVine* into them; And ſo kept himſelfe alive with the *Odour* of them, till the *Feaſt* was paſt. I knew a *Gentleman*, that would faſt (ſometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the ſame Man uſed to have continually, a great *VViſp* of *Herbs*, that he ſmelled on: And amongſt thoſe *Herbe*, ſome *Eſculent Herbs* of ſtrong *Sent*; As *Onions*, *Garlicke*, *Leekes* and the like.

935 They do uſe, for the *Accident*, of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by thoſe *Ill Smells*, the *Riſing* of the *Mother* is put downe.

936 There be *Aires*, which the *Phyſitians* adviſe their *Patients* to remove unto, in *Conſumptions*, or upon *Recovery* of *Long Sickneſſes*: VVhich (commonly are *Plaine Champaignes*, but *Graſing*, and not Over-growne with *Heath*, or the like: Or elſe *Timber-Shades*, as in *Forreſts*, and the like. It is noted alſo, that *Groves* of *Bayes* doe forbid *Peſtilent Aires*; VVhich was accounted a great *Cauſe* of the VVholeſome *Aire* of *Antiochia*. There be alſo ſome *Soyles* that put forth *Odorate Herbs* of themſelves; As *Wilde Thyme*; *Wilde Marjoram*; *Penney-Royall*; *Camomill*; And in which the *Briar-Roſes* ſmell almoſt like *Muske-Roſes*; VVhich (no doubt) are *Signes* that do diſcover an *Excellent Aire*.

937 It were good for *Men*, to thinke of having *Healthfull Aire*, in their *Houſes*; VVhich will never be, if the *Roomes* be *Low-Rooſed*, or ful of *VVindowes*, and *Doores*; For the one maketh the *Aire Cloſe*, and not *Freſh*; And the other maketh it Exceeding *Unequall*; VVhich is a great Enemy to *Health*. The *VVindowes* alſo ſtould not be high up to the *Rooſe*, (which is in uſe for Beautie, and Magnificence,) but Low. Alſo *Stone-Walls* are not wholeſome; But *Timber* is more wholeſome, And eſpcially *Brick*, Nay it hath beene uſed by ſome, with great Succeſſe, to make their *Walls* thick; And to put a Lay of *Chalke* between the *Bricks*, to take away all *Dampiſhneſſe*.

Experiment Solitary, touching the *Emiſſions* of *Spirituall Species* which *effect* the *Anſes*.

THeſe *Emiſſions* (as we ſaid before,) are handled, and ought to be handled, by themſelves, under their *Proper Titles*: That is, *Viſibles*, and *Audibles*, each a-part: In this Place, it ſhall ſuffice to give ſome generall *Obſervations*, Common to both. Firſt, they ſeeme to be *Incorporeall*. Secondly, they VVork *Swiftly*. Thirdly, they VVorke at *Large Diſtances*. Fourthly, in *Curious Varieties*. Fiftly, they are not *Effective* of any *Thing*; Nor leave no

938 *VVorke*

Work behind them; But are *Energies* meerely; For their *Working* upon *Mirrours*, and *Places* of *Eccho*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windowes*, or *Rarifying* the *Aire* by *Great Noises*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake* a *Nature*, as they affect onely such a Rare, and Attenuate *Substance*, as is the *Spirit* of *Living Creatures*.

Experiments in Consort touching *Emission* or *Immateriate Vertues* from the *Mindes*, and *Spirits* of *Men*, either by *Affections*, or by *Imaginations*, or by other *Impressions*.

IT is mentioned in some *Stories*, that where *Children* have been *Exposed*, or taken away young from their *Parents*; And that afterward they have approached to their *Parents* presence, the *Parents*, (though they have not known them,) have had a *Secret Ioy*, or Other *Alteration* thereupon.

939

There was an *Ægytian South-Sayer*, that made *Anthonius* beleeve, that his *Genius*, (which otherwise was *Brave*, and *Confident*,) was, in the Presence of *Octavianus Cæsar*, *Poore*, and *Cowardly*: And therefore, he advised him, to absent himselfe, (as much as he could,) and remove farre from him. The *South-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Ægypt*, and other Remote *Places* from *Rome*. Howsoever the Conceit of a *Predominante* or *Mastering Spirit* of one *Man* over Another, is Ancient, and Received still, even in *Vulgar Opinion*.

940

There are Conceits, that some *Men*, that are of an *Ill*, and *Malancholy Nature*, do incline the *Company*, into which they come, to be *Sad* and *Ill disposed*; And contrariwise, that Others, that are of a *Ioviall Nature*, doe dispose the *Company to be Merry* and *Cheerful*. And again, that some *Men* are *Luckie* to be *kept Company* with, and *Employed*; And others *Unluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence* one with another, as well as from *Body* to *Body*.

941

It hath been observed, that *Old Men* who have loved *Young Company*, and been Conversant continually with them, have beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which ever had *Young Auditors*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who lived till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilius*, &c.

942

Audacity and *Confidence* doth, in Civill Businesse, so great Effects, as a *Man* may (reasonably) doubt, that besides the very *Daring* and *Earnestnesse*, and *Persisting*, and *Importunity*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*.

943

The *Affections* (no doubt) do make the *Spirits* more *Powerful*, and *Active*. And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Love*, and *Envy*, which is called *Oculus Malus*. As for *Love*, the *Platonists*, (some of them,) go so farre as to hold that the *Spirit* of the *Lover*, doth passe into the *Spirits* of the *Person Loved*; Which causeth the desire of Returne into the *Body*, whence it was *Emitted*: Whereupon followeth that *Apetite* of *Contract*, and *Conjunction*, which is in *Lovers*; And this is observed likewise, that the *Aspects* that procure *Love*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Envy*, that emitteth some *Maligne* and *Poysonous Spirits*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath been noted also, that it is most Dangerous, where the

944

Envious Eye is caſt upon *Perſons* in *Glory*, and *Triumph*, and *Ioy*. The *Reaſon* whereof is, for that, at ſuch times, the *Spirits* come forth moſt, into the *Outward Parts*, and ſo meet the *Percuſſion* of the *Envious Eye*, more at *Hand*: And therefore it hath been noted, that after great *Triumphs*, *Men* have been ill diſpoſed, for ſome Dayes following; We ſee the Opinion of *Faſcination* is Ancient, for both *Effects*; Of Procuring *Love*; And *Sickneſſe* cauſed by *Envie*: And *Faſcination* is ever by the *Eye*. But yet if there be any ſuch *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Preſence*, and not by the *Eye* alone; Yet moſt Forcibly by the *Eye*.

945 *Feare*, and *Shame*, are likewiſe *Infective*; For we ſee that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewiſe *Bluſh* in his behalfe.

Now we will ſpeake of the *Force* of *Imagination* upon other *Bodies*; and of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I underſtand to bee, the *Repreſentation* of an *Individuall Thought*. *Imagination* is of three Kindes: The Firſt *Joyned* with *Beleefe* of that which is to *Come*: The Second *Ioyned* with *Memorie* of that which is *Paſt*; And the Third is of *Things Preſent*, or as if they were *Preſent*; For I comprehend in this, *Imagination Faigned*, and at *Pleaſure*; As if one ſhould *Imagine* ſuch a *Man* to bee in the *Veſtments* of a *Pope*; Or to have *Wings*. I ſingle out, for this time, that Which is with *Faith*, or *Beleefe* of that which is to *Come*. The *Inquiſition* of this *Subject*, in our way, (which is by *Induction*,) is wonderfull hard; For the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly be made, but with Extreme Caution; For the Reaſon which wee will after declare.

The *Power* of *Imagination* is in three Kindes; The Firſt, upon the *Body* of the *Imaginant*; Including likewiſe the *Child* in the *Mothers Womb*; the Second is, the *Power* of it upon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*, &c. The Third is, the *Power* of it, upon the *Spirits* of *Men*, and *Living Creatures*; And with this laſt we will onely meddle.

The *Problewe* therefore is, whether a *Man Conſtantly* and *Strongly Beleeving*, that ſuch a *Thing* ſhall be; (As that ſuch an *One* will *Love Him*; Or that ſuch an *One* will *Grant Him* his *Requeſt*; Or that ſuch an *One* ſhall *Recover* a *Sickneſſe*; Or the like;) It doth help any thing to the *Effecting* of the *Thing* it ſelfe. And here againe we muſt warily diſtinguiſh; For it is not meant, (as hath been partly ſaid before,) that it ſhould help by *Making* a *Man More Stout*, or more *Induſtrious*; (in which kinde *Conſtant Beleefe* doth much;) But meerely by a *Secret Ope-*

ration,

ration, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard (as we began to say,) to make any *New Experiment*; For I cannot *command* my Selfe to *Beleeve* what I will, and so no *Triall* can be made. Nay it is worse; For whatsoever a *Man Imagineth doubtingly*, or with *Feare*, must needs doe him hurt, if *Imagination* have any *Power* at all; For a *Man* representeth that oftner, that he feareth, than the contrary.

The helpe therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleefe*, and not by *Himselfe*; untill *Himselfe* have found by *Experience*, that *Imagination* doth prevaile; For then *Experience* worketh in *Himselfe Beleefe*; if the *Beleefe*, that such a *Thing* shall be, be joyned with a *Beleefe* that his *Imagination* may procure it.

For example, I related one time to a *Man*, that was Curious, and Vaine enough in these Things: *That I saw a kind of* Jugler, *that had a* Paire *of* Cards, *and would tell a* Man *what* Card *he thought*. This Pretended learned Man told me; It was a mistaking in Mee, *For* (*said he*) *it was not the* Knowledge *of the* Mans Thought (*for that is Proper to* God,) *but it was the* Inforcing *of a* Thought *upon him, and* Binding *his* Imagination *by a Stronger, that he could* Think no other *Card*. And thereupon he asked me a *Question, or two*, which I thought he did but cunningly, knowing before what used to be the *Feats* of the *Jugler*. *Sir*, (*said he*) *doe you remember whether he told the* Card, *the* Man *thought*, Himselfe, *or bade* Another *to tell it?* I answered (as was true;) *That he bade Another tell it*. Whereunto he said; *So I thought: For* (*said he*) *Himselfe could not have put on so strong an* Imagination; *But by telling the other the* Card, (*who beleeved that the* Jugler *was some Strange* Man, *and could do Strange* Things) *that other* Man *caught a strong* Imagination. I hearkened unto him, thinking for a Vanity he spok prettily. Then he asked me another *question*; Saith he; *Do you remember, whether he bade the* Man *think the* Card *first, and afterwards told the other* Man *in his Eare, what he should think*; *Or else that he did whisper first in the* Mans *Eare, that should tell the* Card, *telling that such a* Man *should thinke such a* Card, *and after bade the* Man *thinke a* Card? I told him, as was true; *That he did first whisper the* Man *in the Ear, that such a* Man *should thinke such a* Card: upon this the *Learned Man* did much exult, and Please himselfe, saying; *Loe, you may see that my* Opinion *is right: For if the* Man *had thought first, his* Though *had been fixed: But the other* Imagining *first, bound his* Thought. Which thought it did somewhat sinke with me, yet I made it Lighter than I thought, and said; *I thought it was* Confederacy, *between the* Jugler *and the two* Servants: Though (indeed) I had no Reason so to thinke: For they were both my *Fathers* servants; And he had never plaid in the House before. The *Jugler* also did cause a *Garter* to be held up; And tooke upon him, to know, that such an *One*, should point in such a *Place*, of the *Garter*; As it should be neare so many *Inches* to the *Longer end*, and so many to the *Shorter*; And still he did it, by *First Telling* the *Imaginer*, and after *Bidding* the *Actour Thinke*.

Having told this *Relation*, not for the Weight thereof, but because it doth handsomely open the *Nature* of the *Question*; I

returne to that I ſaid; That *Experiments* of *Imagination*, muſt be practiſed by others, and not by a *Mans* Selfe. For there bee Three *Meanes* to fortifie *Beleefe*: The firſt is *Experience*: The Second is *Reaſon*: And the Third is *Authoritie*: And that of theſe, which is farre the moſt *Potent*, is *Authoritie*: For *Beleefe* upon *Reaſon*, or *Experience*, will Stagger.

947 For *Authority*, it is of two Kinds; *Beleefe* in an *Art*; And *Beleefe* in a *Man*. And for Things of *Beleefe* in an *Art*; A *Man* may exerciſe them by *Himſelfe*; But for *Beleefe* in a *Man*, it muſt be by *Another*. Therefore if a *Man* beleeve in *Aſtrologie*, and finde a *Figure* Proſperous; Or beleeve in *Natural* Magick, and that a *Ring* with ſuch a *Stone*, or ſuch a *Peece* of a *Living Creature*, Carried, will do good; It may help his *Imagination*: But the *Beleefe* in a *Man* is farre the more *Active*. But howſoever, all *Authority* muſt be out of a *Mans Selfe*, turned (as was ſaid,) either upon an *Art*, or upon a *Man*: and where *Authority* is from one *Man* to another, there the Second muſt be *Ignorant*, and not *Learned*, or *Full* of *Thoughts*; And ſuch are (for the moſt part,) all *Witches*, and *Superſtitious Perſons*; Whoſe *Beleefes*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reaſon*, or *Experience*: And upon the ſame Reaſon, in *Magicke*, they uſe (for the moſt part,) *Boyes*, and *Young People*; whoſe *Spirits* eaſilieſt take *Beleefe*, and *Imagination*.

Now to fortifie *Imagination*, there be three wayes: The *Authoritie* whence the *Beleefe* is derived; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *repent* it, and *Refreſh* it.

948 For the *Authoritie*, we have already ſpoken: As for the Second; Namely the *Meanes* to *Quicken* & *Corroborate* the *Imagination*; Wee ſee what hath been uſed in *Magick*; (If there be in thoſe Practiſes any thing that is purely *Naturall*;) As *Veſtiments*; *Characters*; *Words*; *Seales*; Some parts of *Plants*, or *Living Creatures*; *Stones*; *Choice* of the *Houre*; *Geſtures* and *Motions*; Alſo *Incenſes*, and *Odours*; *Choice* of *Societie*, which increaſeth *Imagination*; *Diets* and *Preparations* for ſome time before. And for *Words*, there have been ever uſed, either *Barbarous Words* of no Senſe, leſt they ſhould diſturb the *Imagination*; Or *Words* of *Similitude*, that may ſecond and feed the *Imagination*: And this was ever as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are uſed alſo *Scripture-Words*; For that the *Beleefe*, that *Religious Texts* and *Words* have Power, may ſtrengthen the *Imagination*. And for the ſame Reaſon, *Hebrew Words*, (which amongſt us is counted the *Holy Tongue*, and the *Words* more *Myſticall*,) are often uſed.

949 For the *Refreſhing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) We ſee the practices of *Magicke*, as in *Images* of *Wax*, and the like, that ſhould Melt by little, and little; Or ſome other *Things Buried* in *Mucke*, that ſhould Putrifie by little and little; Or the like: For ſo oft as the *Imaginant* doth thinke of thoſe Things, ſo oft doth he repreſent to his *Imagination*, the *Effect* of that he deſireth.

950 If there be any *Power* in *Imagination*, it is leſſe credible, that it ſhould be ſo *Incorporeall* and *Immateriate a Vertue*, as to worke at great *Diſtances*; Or though all *Mediums*; Or upon all *Bodies*: But that the *Diſtance* muſt be competent; The *Medium* not Adverſe; And the *Body* Apt and Proportionate. Therefore if there be any Operation upon *Bodies*, in Abſence by Nature

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it is like to be conveyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, ſhould hurt any afarre off, it cannot bee naturally, but by Working upon the *Spirit* of ſome, that commeth to the *Witch*; And from that *party* upon the *Imagination* of *Another*; And ſo upon *Another*; till it come to one that hath reſort to the *Partie Intended*; and ſo by *Him* to the *Partie intended himſelfe*. And although they ſpeake that it ſufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Partie*, or the like; yet there is leſſe Credit to be given to thoſe Things, except it be by *Working* of evill *Spirits*.

The *Experiments*, which may certainly demonſtrate the *Power* of *Imagination*, upon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare Proofes; For that they may bee, by a Tacite *Operation* of *Maligne Spirits*: Wee ſhall therefore be forced in this *Enquirie*, to reſort to New *Experiments*: Wherein we can give onely *Directions* of *Trialls*, and not any *Poſitive Experiments*. And if any *Man* thinke, that we ought to have ſtayed, till wee had made *Experiment*, of ſome of them, our ſelves, (as we do Commonly in other *Titles*,) the Truth is, that theſe *Effects* of *Imagination* upon other *Bodies*, have ſo little Credit with us, as wee ſhall trie them at leiſure: But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is neceſſary, that He, by whom you worke, have a *Precedent Opinion* of you, that you can doe Strange Things; Or that you are a *Man* of *Art*, as they call it; For elſe the Simple *Affirmation* to Another, that this or that ſhall be, can worke but a weake *Impreſſion*, in his *Imagination*. 951

It were good, becauſe you cannot diſcerne fully of the *Strength* of *Imagination*, in one *Man* more then another, that you did uſe the *Imagination* of more then *One*; That ſo you may light upon a *Strong One*. As if a *Phyſitian* ſhould tell Three, or Foure, of his *Patients Servants*, that their *Maſter* ſhall ſurely recover. 952

The *Imagination* of *One*, that you ſhall uſe, (ſuch is the Varietie of *Mens Mindes*) cannot be alwayes alike *Conſtant*, and *Strong*; And if the Succeſſe follow not ſpeedily, it will faint and leeſe *Strength*. To remedy this, you muſt pretend to Him, whoſe *Imagination* you uſe, ſeverall degrees of *Means* by which to *Operate*; As to preſcribe him, that every Three Dayes, if hee finde not the Succeſſe Apparent, he do uſe another *Root*, or *Part* of a *Beaſt*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another, till Seven Times. Alſo you muſt preſcribe a good Large Time for the *Effect* you promiſe; As if you ſhould tell a *Servant* of a *Sicke-man*, that his *Maſter* ſhall recover, but it will be Fourteene dayes, ere he findeth it apparently, &c. All this to entertain the *Imagination*, that it waver leſſe. 953

It is certain, that *Potions*, or *Things* taken into the *Body*: *Incenſes* and *Perfumes* taken at the *Noſthrils*; And *Oyntments* of ſome *Parts*; doe (naturally) worke upon the *Imagination* of Him that taketh them. And therefore it muſt needs greatly *Cooperate* with the *Imagination* of him, whom you uſe, if you preſcribe him, before he doe uſe the *Receit*, for the *Worke* which he deſireth, that he doe take ſuch a *Pill* or a *Spoonfull* of *Liquour*; Or burne ſuch an *Incenſe*; Or *Annoint* his *Temples*, or the *Soles*, of his *Feet*, with ſuch an *Oint-* 954

ment or *Oyle*: And you muſt chuſe, for the *Compoſition* of ſuch *Pill*, *Perfume*, or *Oyntment*, ſuch *Ingredients* as doe make the *Spirits* a little more *Groſſe*, or *muddy*; Whereby the *Imagination* will fix the better.

955 The *Body Paſſive*, and to be *Wrought Upon*, (I meane not of the *Imaginant*) is better wrought upon, (as hath been partly touched) at ſome *Times*, than at others: as if you ſhould preſcribe a *Servant*, about a *Sicke Perſon*, (whom you have poſſeſſed, that his *Maſter* ſhall recover,) when his *Maſter* is faſt aſleepe, to uſe ſuch a *Root*, or ſuch a *Root*. For *Imagination* is like to work better upon *Sleeping Men*, than *Men Awake*; As we ſhall ſhew when we handle *Dreames*.

956 We finde in the *Art* of *Memory*, that *Images Viſible*, worke better than other *Conceits*: As if you would remember the Word *Philoſophy*, you ſhall more ſurely do it, by *Imagining*, that ſuch a *Man*, (For *Men* are beſt *Places*) is reading upon *Ariſtotles Phyſicks*; than if you ſhould Imagin him to ſay; *I'le goe ſtudy Philoſophy*. And therefore, this *Obſervation* would be tranſlated to the *Subject* we now ſpeak of: For the more Luſtrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you ſhall, in that *Experiment*, (whereof we ſpake before,) of *Binding* of *Thoughts*, leſſe faile, if you tell One, that ſuch an *One* ſhall name one of *Twenty Men*, than if it were *One* of *Twenty Cards*. The *Experiment* of *Binding* of *Thoughts*, would be Diverſified, and tried to the Full: And you are to note, whether it hit for the moſt part, though not alwayes.

957 It is good to conſider, upon what *Things*, *Imagination* hath moſt Force: And the *Rule*, (as I conceive,) is, that it hath moſt *Force* upon *Things*, that have the *Lighteſt*, and *Eaſieſt Motions*. And therefore above all, upon the *Spirits* of *Men*: And in them, upon ſuch *Affections*, as move *Lighteſt*; As upon *Procuring* of *Love*; *Binding* of *Luſt*, which is ever with *Imagination*, upon *Men* in *Feare*; Or *Men* in *Irreſolution*; And the like. Whatſoever is of this kinde would be thorowly enquired. *Trialls* likewiſe would be made upon *Plants*, and that diligently: As if you ſhould tell a *Man*, that ſuch a *Tree* would Dye this yeare; And will him at theſe and theſe times, to goe unto it, to ſee how it thriveth. As For *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Caſting* of *Dice*, are very *Light Motions*: And there is a *Folly* very uſefull, that *Gameſters* imagine, that ſome that ſtand by them, bring them ill Luck. There would be Triall alſo made, of holding a *Ring* by a *Threed* in a *Glaſſe*, and telling him that holdeth it, before, that it ſhall ſtrike ſo many times againſt the *Side* of the *Glaſſe*, and no more; Or of Holding a *Key* between two *Mens Fingers*, without a *Charme*; And to tel thoſe that hold it that at ſuch *Name*, it ſhall go off their *Fingers*. For theſe two are extreme *Light Motions*. And howſoever I have no opinion of theſe things, yet ſo much I conceive to be true; That *Strong Imagination* hath more Force upon *Things Living*, Or that have been *Living*, than *Things* meerely *Inanimate*: And more Force likewiſe upon *Light*, and *Subtill Motions*, than upon *Motions Vehement*, or *Ponderous*.

958 It is an uſuall *Obſervation*, that if the *Body* of One *Murthered*, be brought before the *Murtherer*, the *Wounds* will bleed a-freſh. Some doe affirme, that the *Dead Body*, upon the Preſence of the *Murtherer*, hath opened the *Eyes*; And that there have been ſuch like *Motions*, as well where the *Partie Murthered* hath been *Strangled*, or *Drowned*, as where they have been *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Juſt Judgement, who uſually bringeth *Murders* to Light: But if it be *Naturall*, it muſt be referred to *Imagination*.

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The *Tying* of the *Point* upon the day of *Marriage*, to make *Men* impotent towards their *Wives*, which (as we have formerly touched,) is ſo frequent in *Zant*, and *Gaſcony*, if it be *Naturall*, muſt be referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceive it to have the leſſe Affinitie with *Witchcraft*, becauſe not Peculiar Perſons onely, (ſuch as *Witches* are,) but any *Body* may doe it. 959

THere be many *Things*, that worke upon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worne, have beene anciently and generally Received; and curiouſly aſſigned to worke ſeverall *Effects*. So much is true; That *Stones* have in them fine *Spirts*; As appeareth by their *Splendour*: And therefore they may work by *conſent* upon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Thoſe that are the beſt, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be given to them. But it is manifeſt, that *Light*, above all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the ſame *Effect*, with more *Novelty*. And this is one of the *Cauſes*, why *Precious Stones* comfort. And therefore it were good to have *Tinctèd Lanthornes*, or *Tinctèd Skreenes*, of *Glaſſe Coloured* into *Greene*, *Blew*, *Carnation*, *Crimſon*, *Purple*, &c. And to uſe them with *Candles* in the *Night*. So likewiſe to have Round *Glaſſes*, not onely of *Glaſſe Coloured thorow*, but with *Colours* laid between *Criſtals*, with *Handles* to hold in ones Hand. *Priſmes* are alſo Comfortable Things, they have of *Paris-Work*, *Looking-Glaſſes*, bordered with broad *Borders* of ſmall *Criſtal* and great Counterfeit *Precious Stones*, of all *Colours*, that are moſt Glorious and Pleaſant to behold; Eſpecially in the *Night*. The *Pictures* of *Indian Feathers*, are likewiſe Comfortable, and Pleaſant to behold. So alſo Faire and Cleare *Pooles* doe greatly comfort the *Eyes*, and *Spirits*; Eſpecially when the *Sunne* is not *Glaring* but *Overcaſt*; Or when the *Moone* ſhineth. Experiments in Comfort, touching the *Secret Vertue* of *Sympathy*, and *Antipathy*. 960

There be divers Sorts of *Bracelets* fit to *Comfort* the *Spirits*; And they be of Three *Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wiſh them to be of *Pearle*, or of *Corall*, as is uſed. And it hath beene noted that *Corall*, if the *Party* that weareth it be ill diſpoſed, will wax *Pale*: Which I beleeve to be true, becauſe otherwiſe diſtemper of *Heat* wil make *Corall* loſe Colour. I Commend alſo *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with ſome *Cordiall Mixture*. 961

For *Corroboration* and *Confortation*, take ſuch *Bodies* as are of *Aſtringent Quality*, without *Manifeſt Cold*. I commend *Bead-Amber*, which is full of *Aſtriction*, but yet is *Vnctious*, and not *Cold*; And is conceived to *Impinguate* thoſe that weare ſuch *Beads*: I commend alſo *Beads* of *Harts-Horne*, and *Ivory*, which are of the like Nature; Alſo *Orenge-Beads*; Alſo *Beads* of *Lignum Aloes*, *Macerated* firſt in *Roſe-Water*, and *Dryed*. 962

For *Opening*, I Commend *Beads*, or *Peeces* of the *Roots* of *Carduus Benedictus*: Alſo of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*. 963

The Cramp, (no doubt) commeth of *Contraction* of *Sinewes*; Which is Manifeſt, in that it commeth either by *Cold*, or *Drineſſe*; As after *Conſumptions*, & *Long Agues*; For *Cold* and *Drineſſe* do (both of them) *Contract*, and *Corrugate*. We ſee alſo, that *Chafing* a little above the *Place* in paine, eaſeth the *Cramp*; Which is wrought by the *Dilatation*, of the *Contracted Sinewes*, by *Heat*. There are in uſe, for the Prevention of the *Cramp*, two Things; 964

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The one *Rings* of *Sea-Horſe Teeth*, worne upon the *Fingers*; The other *Bands* of *Greene Perewinckle*, (the Herb,) tied about the *Calfe* of the *Leg*, or the *Thigh*, &c. where the *Cramp* uſeth to come. I doe finde this the more ſtrange, becauſe Neither of theſe have any *Relaxing Vertue*, but rather the Contrary. I judge therefore, that their *Working* is rather upon the *Spirits*, within the *Nerves*, to make them ſtrive leſſe, Than upon the *Bodily Subſtance* of the *Nerves*.

965 I would have *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trochiſch* of *Vipers*, made into little *Peeces* of *Beads*; For ſince they doe great Good Inwards, (eſpecially for *Peſtilent Agues*,) it is like they will be Effectuall Outwards; Where they may be applyed in greater *Quantity*. There would be *Trochiſchs* likewiſe made of *Snakes*; Whoſe *Fleſh dried*, is thought to have a very *Opening*, and *Cordial Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would bee made up with *Amber-Grice*, and ſome *Pomander*.

966 It hath beene long received, and confirmed by divers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth help the *Falling Sickneſſe*; And likewiſe the *Incubus*, which we call the *Mare*. The *Cauſe* of both theſe *Diſeaſes*, and eſpecially of the *Epilepſie* from the *Stomach*, is the *Groſſeneſſe* of the *Vapours*, which riſe and enter into the *Cells* of the *Braine*: And therefore the *Working* is, by *Extreme*, and *Subtill Attennation*; Which that *Simple* hath. I judge the like to bee in *Caſtoreum*, *Muſke*, *Ren-Seed*, *Agnus Caſtus Seed*, &c.

967 There is a *Stone*, which they call the *Bleud-Stone*, which worne is thought to bee good for them that *Bleed* at the *Noſe*: Which (no doubt) is by *Aſtriction*, and *Cooling* of the *Spirits*. *Quære*, if the *Stone* taken out of the *Toads Head*, be not of the like Vertue; For the *Toad* loveth *Shade*, and Coolneſſe.

968 *Light* may be taken from the *Experiment* of the *Horſe-Tooth-Ring*, and the *Garland* of *Periwinckle*, how that thoſe things, which aſſwage the *Striſe* of the *Spirits*, do help diſeaſes, contrary to the *Intention* deſired: for in the *Curing* of the *Cramp*, the *Intention* is, to relax the *Sinewes*; But the *Contraction* of the *Spirits*, that they ſtrive leſſe, is the beſt Help: So to procure eaſie *Travailes* of *Women*, the *Intention* is to bring down the *Childe*; But the Help is, to ſtay the *Comming down* too *Faſt*: Whereunto they ſay, the *Toad-Stone* likewiſe helpeth. So in *Peſtilent Feavers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evaporation*; But the beſt *Meanes* to do it, is by *Nitre*, *Diaſcordium*, and other *Coole Things*, which doe for a time arreſt the *Expulſion*, till *Nature* can doe it more quietly. For as one ſaith prettily; *In the Quenching of the Flame of a Peſtilent Ague, Nature is like People that come to quench the Fire of a Houſe; which are ſo buſie, as one of them letteth another.* Surely, it is an Excellent *Axiome*, and of Manifold *Vſe*, that whatſoever appeaſeth the *Contention* of *Spirits*, furthereth their *Action*.

969 The *Writers* of *Naturall Magick*, commend the Wearing of the *Spoile* of a *Snake*, for *Preſerving* of *Health*. I doubt it is but a *Conceit*: For that the Snake is thought to renew her *Youth*, by Caſting her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a Peece of a *Harts-Horne*, beauſe thoſe Renew

970 It hath been Anciently *Received*, (For *Pericles* the *Athenian* uſed it,) and it is yet in uſe, to weare little *Bladders* of *Quick-Silver*, or *Tablets* of *Arſenicke*, as *Preſervatives* againſt the *Plague*: Not as they conceive, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poyſons* themſelves, they draw the *Venome* to them, from the *Spirits*.

Vide

Vide the *Experiments* 95. 96. and 97. touching the *Severall Sympathies*, and *Antipathies*, for *Medicinall Vse*. 971

It is ſaid, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beaſt* of great *Edacitie* and *Diſgeſtion*; And ſo it may be, the *Parts* of him comfort the *Bowels*. 972

We ſee *Scare-Crowes*, are ſet up to keep *Birds* from *Corne*, and *Fruit*; It is reported by ſome, that the *Head* of a *Wolfe*, whole, dried and hanged up in a *Dove-Houſe*, wil ſcare away *Vermine*; ſuch as are *Weaſils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For thoſe *Vermine* with us, know *Dogs* better then *Wolves*. 973

The *Braines* of ſome *Creatures*, (when their *Heads* are roaſted) taken in *Wine*, are ſaid to ſtrengthen the *Memory*: As the *Braines* of *Hares*; *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it ſeemeth to be incident to the *Braines* of thoſe *Creatures*, that are Fearefull. 974

The *Ointment*, that *Witches* uſe, is reported to be made, of the *Fat of Children*, digged out of their *Graves*; Of the *Iuyces* of *Smallage*, *Wolfe-Bane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I ſuppoſe, that the *Soporiferous Medicines* are likeſt to do it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Safforn*, *Poplar-leaves*, &c. 975

It is reported by ſome, that the *Affections* of *Beaſts*, when they are in Strength, doe adde ſome *Vertue*, unto *Inanimate Things*; As that the *Skin* of a *Sheep*, devoured by a *Wolfe*, moveth *Itching*; That a *Stone* bitten by a *Dog* in Anger, being throwne at him, drunke in *Powder* provoketh *Choler*. 976

It hath beene obſerved, that the *Diet* of *Women* with *Childe*, doth worke much upon the *Infant*; As if the *Mother* eate *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to repreſſe and ſtay *Vapours*, that aſcend to the *braine*,) it will make the *Childe* Ingenious: Aud on the contrarie ſide, if the *Mother* eat (much) *Onions* or *Beanes*, or ſuch *Vopourous Food*; Or drinke *Wine* or *Strong Drinke*, immoderately; Or *Faſt* much; Or be given to much *Muſing*; (All which ſend, or draw *Vapours* to the *Head*,) It indangereth the *Childe* to become *Lunaticke*, or *of Imperfect Memory*: And I make the ſame Judgement of *Tobacco*, often taken by the *Mother*. 977

The *Writers* of *Naturall Magick* report, that the *Heart* of an *Ape* worne neare the *Heart*, comforteth the *Heart*, and increaſeth *Audicity*. It is true, that the *Ape* is a Mery and Bold *Beaſt*. And that the ſame *Heart* likewiſe of an *Ape* applyed to the *Necke*, or *Head*, helpeth the *Wit*; And is good for the *Falling-Sickneſſe*: The *Ape* alſo is a Witty *Beaſt*, and hath a *Drie Braine*; Which may be ſome *Cauſe* of *Attenuation* of *Vapours* in the *Head*. Yet it is ſaid to move *Dreames* alſo. It may be the *Heart* of a *Man* would doe more, but that it is more againſt *Mens* mindes to uſe it; Except it be in ſuch as weare the *Reliques* of *Saints*. 978

The *Fleſh* of a *Hedge-Hog*, Dreſſed, and Eaten, is ſaid to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, muſt needs be *Harſh*, and *Drie*, becauſe it putteth forth ſo many *Prickles*: For *Plants* alſo, that are full of *Prickles*, are generall Dry: As *Briers*, *Thornes*, *Barberries*: And therefore the *Aſhes* of an *Hedge-Hog* are ſaid to be a great *Diſiccative* of *Fiſtula's*. 979

Mummy hath great force in *Stanching* of *Blood*; which, as it may be aſcribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may alſo partake of a Secret *Proprietie*; In that the *Blood* draweth *Mans Fleſh*. And it is approved, that the *Moſſe*, which groweth upon the *Skull* of a *Dead Man* unburied, will ſtanch *Blood* Potently. And ſo to doe the *Dregs* or *Powder* of *Blood*, ſevered from the *Water*, and *Dried*. 980

981 It hath been practised, to make *White* Swallows, by *Anointing* of the *Egs* with *Oyle*, Which *effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more Penurious. And it may be, the *Anointing* of the *Egs*, will be as Effectuall, as the *Anoynting* of the *Body*; Of which *Vide* the *Experiment* 93.

982 It is reported, that the *White* of an *Egge*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltnesse*; and maketh the *Water* sweeter. This may be by *Adhesion*; as in the 6. *Experiment* of *Clarification*: It may be also, that *Bloud*, and the *White* of an *Egge*, (which is the *Matter* of a *Living Creature*,) have some *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. Wee see that *Salt* laid to a *Cut finger*, healeth it; So as it seemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

983 It hath been anciently received, that the *Sea Hare* hath an *Antipathy* with the *Lungs*, (if it commeth neere the Body,) and erodeth them. Whereof the *Cause* is conceived to be, a *Qualitie* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* have upon the *Watry Parts* of the *Body*; As *Vrine* and *Hydropicall Water*. And it is a good *Rule*, that whatsoever hath an *Operation* upon certain *Kindes* of *Matters*, that, in *Mans Body*, worketh most upon those *Parts*, wherein that kinde of *Matter* aboundeth.

984 Generally, that which is *Dead* or *Corrupted*, or *Excerned*, hath *Antipathy* with the same *Thing*, when it is *Alive*, and when it is *Sound*; And with those *Parts* which doe *Excerne*: As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pocks*, *Scabs*, *Leprosie*, to *Sound Flesh*; And the *Excrements* of every *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse Pernicious then the *Corruptions*.

985 It is a Common *Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection* some Petty *Fellow* is sent out to kill the *Dogs*; And that though they have never seene him before, yet they will all come forth, and barke, and flie at him.

986 The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so uncertain, as they require a great deale of *Examination*, ere we conclude upon them. I would have it first thorowly inquired, whether there be any Secret Passages of *Sympathy* between *Persons* of *neare Blood*; As *Parents*, *Children*, *Brothers*, *Sisters*, *Nurse Children*, *Husbands*, *Wives*, &c. There be many reports in *Histories*, that upon the *Death* of *Persons* of such Neareneſse, *Men* have had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dream*, which I told to divers *English Gentlemen*; That my *Fathers House*, in the *Country*, was *Plaistered* all over with *Blacke Mortar*. There is an Opinion abroad, (whether idle or no I cannot say,) That loving and kinde *Husbands* have a *Sense* of their *Wives* breeding *Childe*, by some *Accident* in their owne *Bodie*.

Next to those that are *Neare* in *Bloud*, there may be the like *Passage*, and *Instincts* of *Nature*, between great *Friends* and *Enemies*. And sometime the Revealing is unto Another *Person*, and not to the *Party* Himselfe. I remember *Philippus Cominæus* (a grave Writer,) reporteth; That the *Arch-Bishop* of *Vienna*, (a *Reverend Prelate*,) said (one day) after *Masse*, to *King Lewis* the eleventh of *France*; *Sir*, *your Mortall Enemy is dead*; What time *Charles Duke* of *Burgundy* was Slain, at the *Battell* of *Granson*, against the *Switzers*. Some trial also would be made, whether *Pact* or *Agreement* do any thing; As if two *Friends* should agree, that such a *Day* in every *Week*, they

being

being in farre *Distant Places*, should *Pray* one for Another; Or should put on a *Ring* or *Tablet*, one for anothers Sake; Whether if one of them should breake their *Vow* and *Promise*, the other should have any *Feeling* of it, in *Absence*.

If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons*; It 988
is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost, in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth; Because of the great *Ioy*, or *Griefe*, that many *Men* are possest with at once? *Pius Quintus*, at the very time, when that Memorable *Victory* was won, by the *Christians*, against the *Turkes*, at the *Navall Battell* of *Lepanto*, being then hearing of *Causes* in *Consistory*, brake off suddenly, and said to those about him, *It is now more time we should give thankes to God, for the great Victory he hath granted us, against the Turks*; It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was meerely his Worke, to conclude that *League*. It may be, that *Revelation* was *Divine*; But what shall we say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Playes*, have had Newes of *Victories*, and *Overthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition*: Namely, that men observe when *Things Hit*, and not when they *Misse*: And commit to Memorie the one, and forget and passe over the other. But touching *Divination*, and the *Misgiving* of *Mindes*, we shall speake more, when we handle in generall the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

We have given formerly some *Rules* of *Imagination*; and touching the 989
Fortifying of the Same. We have set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, upon *Beasts*, *Birds*, &c. upon *Plants*; And upon *Inanimate Bodies*: Wherein you must still observe, that your *Trialls* be upon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating* or *Flying*: And I leave it to every *Man*, to choose *Experiments*, which himselfe thinketh most commodious; Giving now but a few *Examples* of every of the Three Kindes.

Use some *Imaginant*, (observing the *Rules*, former prescribed,) for *Binding* 990
of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trie also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more Hardy, and the other more Cowardly. It would be tried also in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hart*, with *Grey-Hounds*; Or in *Horse-Races*; And the like *Comparative Motion*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not runne.

In *Plants* also, you may trie the *Force* of *Imagination*, upon the *Lighter* 991
Sort of *Motions*: As upon the sudden *Fading*, or Lively *Comming up* of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Closing*, and *Opening*; &c.

For *Inanimate Things*, you may trie the *Force* of *Imagination*, upon Stay- 992
ing

ing the *Working* of *Beere*, when the *Barme* is put in; Or upon the *Comming* of *Butter*, or *Cheeſe*, after the *Cherming*, or the *Rennet* be put in.

993 It is an Ancient *Tradition*, everie were alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long Sticke, doth ſtupifie the *Hand* of him that toucheth it. It is one degree of *Working* at *Diſtance*, to work by the Continuance of a Fit *Medium*; As *Sound* will be conveyed to the *Eare*, by ſtriking upon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

994 The *Writers* of *Naturall Magick*, doe attribute much to the *Vertues*, that come from the *Parts* of *Living Creatures*; So as they be taken from them, the *Creatures* remaining ſtill alive: As if the *Creature* ſtill living did infuſe ſome *Immateriate Vertue*, and *Vigour* into the *Part Severed*. So much may be true; that any *Part*, taken from a *Living Creature*, newly *Slaine*, may be of greater force then if it were taken from the like *Creature*, *dying* of it *Selfe*, becauſe it is fuller of *Spirit*.

995 Triall would be made, of the like *Parts* of *Individualls*, in *Plants*, and *Living Creatures*; As to cut off a *Stock* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to ſee whether it will Decay the Reſt of the *Stock*: Or if you ſhould cut off part of the *Taile*, or *Legge* of a *Dogge*, or a *Cat*, and lay it to *Putrifie*, and to ſee whether it will *Feſter*, or keep from *Healing*, the *Part* which remaineth.

996 It is received, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bracelet* of the *Haire* of the *Party Beloved*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Favour*, may as well doe it.

997 The *Sympathie* of *Individuals*, that have been *Entire*, or have *Touched*, is of all others the moſt *Incredible*: Yet according unto our faithfull Manner of *Examination* of *Nature*, we wil make ſome little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waſte, and conſume, is a Common *Experiment*: And I doe apprehend it the rather, becauſe of mine one *Experience*. I had from my *Childhood*, a *Wart* upon one of my *Fingers*: Afterwards when I was about Sixteen Yeares, old, being then at *Paris*, there grew upon both my *Hands* a Number of *Warts*, (at leaſt an hundred,) in a months ſpace, The *Engliſh Embaſſadours Lady*, who was a *Woman* far from *Superſtition*, told me one day; She would help me away with my *Warts*: Whereupon ſhe got a *Peece* of *Lard* with the *Skin* on, and rubbed the *Warts* all over with the *Fat Side*; and amongſt the reſt, that *Wart* which I had had from my *Childhood*; Then ſhee nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, upon a *Poaſt* of her *Chamber Window* which was to the *South*. The Succeſſe was, that within five weeks ſpace, all the *Warts* went quite away: And that *Wart*, which I had ſo long endured, for Company. But at the reſt I did little marvell, becauſe they came in a Short time, and might go away in a Short Time again: But the Going of that, which had ſtaid ſo long, doth yet ſtick with me. They ſay the like is done by the *Rubbing* of *Warts* with a Green *Elder Stick*, & then *Burying* the *Stick* to *Rot* in *Mucke*. It would be tried, with *Cornes* and *Wenns*, and ſuch other *Excreſcences*, I would have it alſo tried, with ſome *Parts* of *Living Creatures*, that are neareſt the *Nature* of *Excreſcences*; As the *Combs* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beaſts*, &c. And I would have it tried both wayes; Both by *Rubbing* thoſe *Parts* with *Lard*, or *Elder*, as before; And by *Cutting off* ſome *Peece* of thoſe *Parts*, and laying it to *Conſume*. To ſee whether it wil Worke any Effect, towards the *Conſumption* of that *Part*, which was once *Ioyned* with it.

It

998

It is constantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, upon the Relation of *Men* of *Credit*, (though my selfe, as yet, am not fully inclined to believe it,) you shal note the *Points* following; First, the *Ointment*, wherewith this is done, is made of Divers *Ingredients*; whereof the Strangest and Hardest to come by, are the *Mosse* upon the *Skull* of a *dead Man*, *Unburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These Two last I could easily suspect to be prescribed as a Starting Hole; That if the *Experiment* proved not, it mought be pretended, that the *Beasts* were not killed in the due Time; For as for the *Mosse*, it is certain there is great Quantity of it in *Ireland*, upon *Slain Bodies*, laid on *Heaps*, *Unburied*. The other *Ingredients* are, the *Bloud-Stone* in *Powder*, and some other *Things*, which seeme to have a *Vertue* to *Stanch Bloud*; As also the *Mosse* hath. And the *Description* of the *whole Ointment* is to be found in *Chymicall Dispensatory* of *Crollius*. Secondly, the same *Kind* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*, but onely applied to the *Weapon*. Thirdly, (which I like well) they do not observe the *Consecting* of the *Ointment*, under any certain *Constellation*; which comonly is the Excuse of *Magicall Medicines*, when they fail, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the Party, to be *Cured*, is not needfull to Concurre; For it may be done, without the Knowledge of the *Party Wounded*; And thus much hath been tried, that the *Ointment* (for *Experiments* sake,) hath been wiped off the *Weapon*, without the Knowledge of the *Party Hurt*, and presently the *Party Hurt*, hath been in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Annointing* of that *Instrument* will serve, and work the *Effect*. This I doubt should be a Device, to keep this strange *Forme* of *Cure*, in Request, and Use Because many times you cannot come by the *Weapon* it selfe. Seventhly, the *Wound* must be at first *Washed clean*, with *White Wine*, or the *Parties* own *Water*; And then bound up close in *Fine Linen*, and no more *Dressing* renewed, till it be *whole*. Eighthly, the *Sword* it selfe must be *Wrapped* up *Close*, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you *wipe* it off from the *Sword*, and keep it, will *Serve again*; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointment* of *Wounds* commonly doe. Lastly it will *Cure* a *Beast*, as well as a *Man*; which I like best of al the rest, because it subjecteth the *Matter*, to an *Easie Triall*.

Experiment Solitary, touching *Secret Proprieties*.

999

I Would have *Men* know, that though I reprehend, the *Easie Passing over*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues* and *Proprieties*; (For this hath arrested, and laid a sleep, al true *Enquiry*, and *Indication*;) yet I do not understand, but that in the *Practical Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this is not only in the in *Specie* but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be Cooling; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*; That it must go to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receive from *Experience*, that *Powder* of *Chamæ-*

pyis or the like, drunk in Beere, is good for the *Iaundies*: So againe, a wiſe *Phyſitian* doth not continue ſtill the ſame *Medicine*, to a *Patient*; But he will vary it the firſt *Medicine* doth not apparently ſucceed: For of thoſe *Remedies*, that are good for the *Iaundies*, *Stone*, *Agues*, &c. that will do good in one *Body*, which will not doe good in another; According to the Correſpondence the *Medicine* hath to the *Individuall body*.

Experiment Solitary, touching the *General Sympathy* of Mens Spirit 1000.5.

THe *Delight* which *Men* have in *Popularitie*, *Fame*, *Honour*, *Submiſſion*, and *Subjection* of other *Mens Mindes*, *Wills*, or *Affections*, (although theſe *Things* may be deſired for other *Ends*,) ſeemeth to be a *Thing*, in it ſelfe, without Contemplation of Conſequence, Gratefull and agreeable to the *Nature* of *Man*. This Thing (ſurely) is not without ſome Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Divine Limbus*; Elſe why be men ſo much affected with that, which others think, or ſay? The beſt Temper of *Mindes* deſireth *Good Name*, and *True Honour*: The Lighter, *Popularity*, and *Applauſe*; The more depraved, *Subjection*, and *Tyranny*; As is ſeen in great *Conquerors*, and *Troublers* of the *World*: And yet more in *Arch-Hereticks*; for the Introducing of new *Doctrines*, is likewiſe an *Affectation* of *Tyranny* over the *Vnderſtandings*, and *Beleefes* of *Men*.

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FINIS.

His Lo^ps. Vſuall Receipt for the Gout, to which the Sixtieth Experiment hath reference, was this

To be taken in this Order.

1. The Pultaſſe.

℞. *Of Manchett, about* 3. *Ounces, the Crumme only, thin cut; Let it be boyled in Milk, till it grow to a Pulp. Adde, in the end, a Dramme, and an halfe, of the powder of Red Roſes.*
Of Saffron 10. *Graines.*
Of Oyle of Roſes an Ounce.
Let it be ſpread upon a Linnen Cloth, and applied luke-warme; And continued for three Houres ſpace.

2. The Bath, or Fomentation.

℞. *Of Sage Leaves, halfe a handfull.*
Of the Root of Hemlocke, Sliced, 6. *Drams.*
Of Briony Roots, halfe an Ounce.
Of the Leaves of Red Roſes, 2. *Pugills.*
Let them be boyled in a pottle of Water, wherein ſteele hath beene quenched till the Liquour come to a quart. After the Straining, put in halfe a handfull of Bay-Salt.
Let it be uſed, with Scarlet Cloth or Scarlet Wooll, dipped in the Liquour, hot, and ſo renewed ſeven times; All in the ſpace of a quarter of an Houre, or little more.

3. The Plaſter.

℞. Emplaſtrum Diacalciteos, *as much as is ſufficient, for the part you meane to cover. Let it be diſſolved with Oyle of Roſes, in ſuch a Conſiſtence, as will ſticke; And ſpred upon a peece of Holland, and applyed*